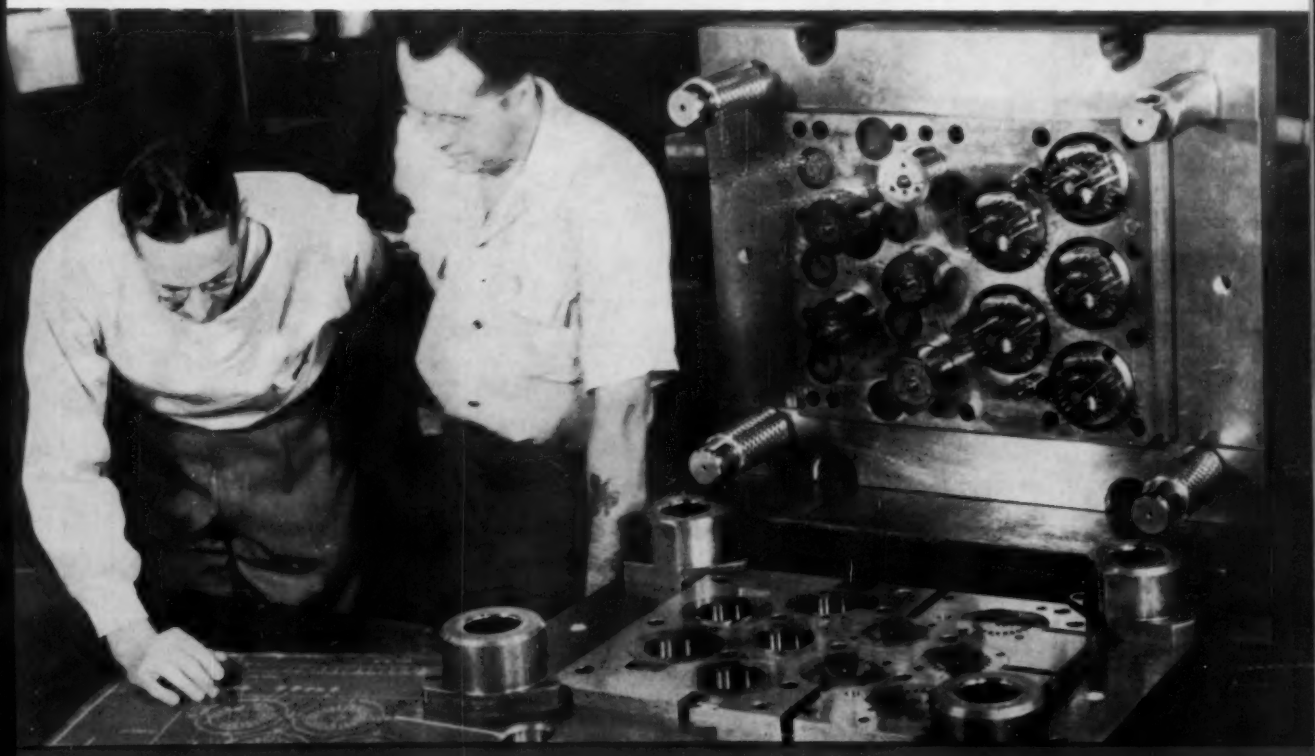
September 13, 1956

The IRON AGE

The National Metalworking Weekly

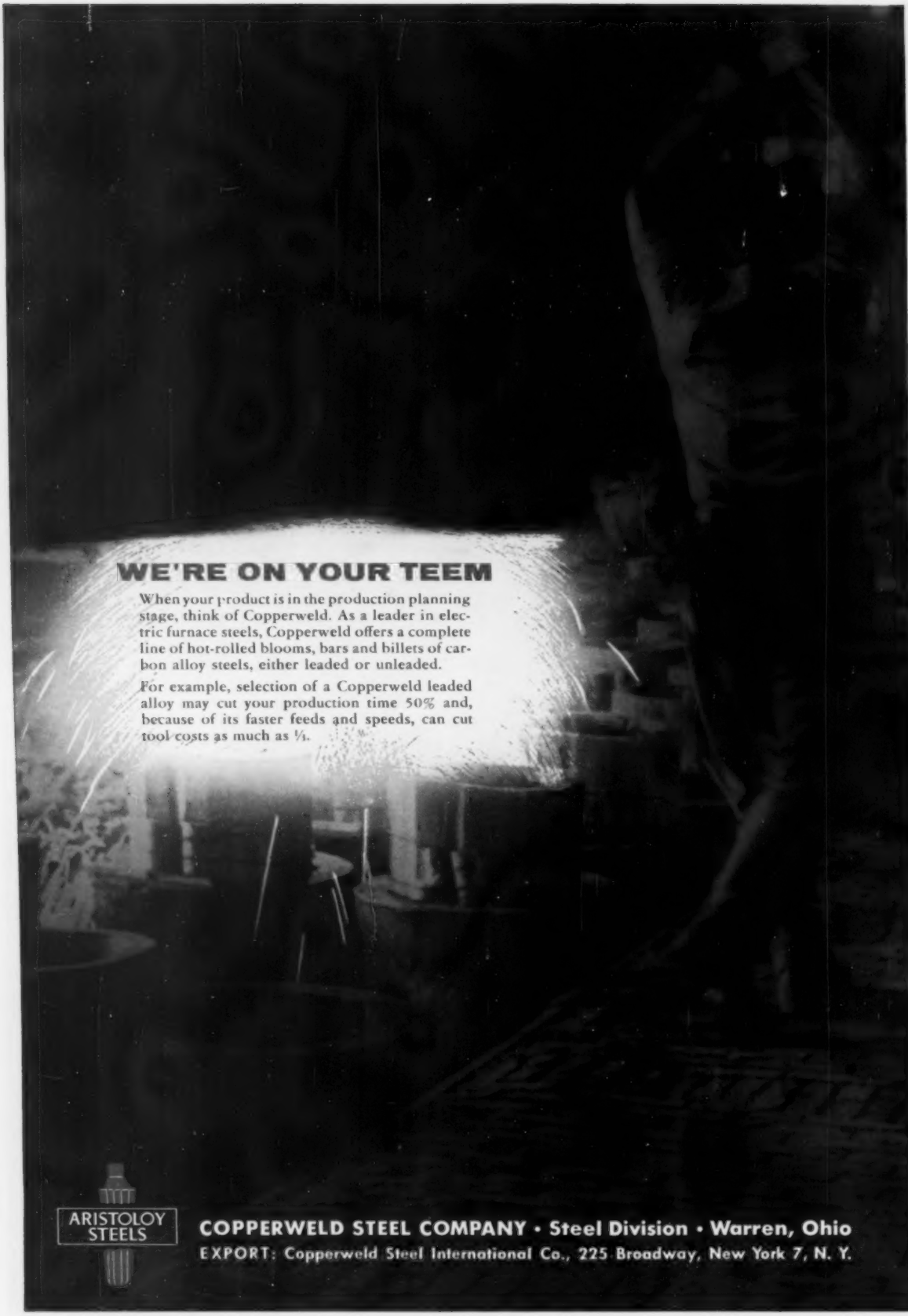


Stamping: The Case for Carbide Dies P.91

When Will Aluminum Output Match Demand? P.51

Foreign Ores: Insurance For Steel Supply P.56

Digest of the Week P–2


WE'RE ON YOUR TEEM
When your product is in the production planning stage, think of Copperweld. As a leader in electric furnace steels, Copperweld offers a complete line of hot-rolled blooms, bars and billets of carbon alloy steels, either leaded or unleaded.
For example, selection of a Copperweld leaded alloy may cut your production time 50% and, because of its faster feeds and speeds, can cut tool costs as much as ⅓.
ARISTOLOY STEELS
COPPERWELD STEEL COMPANY • Steel Division • Warren, Ohio
EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

The blade of this Pincor 22-inch trimmer-type rotary mower is made from a Bethlehem special section.

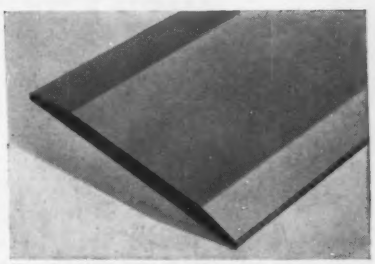
Specially rolled rotary mower blade costs less, gives better service

Rotary power mower blades are often formed from flat rolled steel, then sharpened. One of the country's biggest makers of mowers, however, has found a better way—using Bethlehem hot-rolled special sections.

Pioneer Gen-E-Motor Corporation of Chicago, manufacturer of Pincor power mowers, had good reasons for switching to Bethlehem special sections. These sections, rolled to the customer's drawings and specifications, yield a uniform product which is more easily controlled in fabrication and heat-treatment. Their double-bevel shape reduces the forming required, and the blade, sharpened with a minimum of grinding, is more rigid, more durable — a far better blade in every way.

We urge you to consider applications for hot-rolled special sections in the products you make. Special sections can often be substituted for fabricated parts at far less cost. By using stock shaped by rolling you may be able to eliminate machining operations and avoid scrap loss. What's more, a special section may be substituted for units which you now fabricate from a number of parts.

Would you like to know more about Bethlehem hot-rolled special sections? Please call on the nearest Bethlehem sales office.



This double-bevel special section requires very little grinding . . . makes a strong, durable blade.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

Sept. 13, 1956—Vol. 178, No. 11

The IRON AGE

Digest of the Week in Metalworking

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Chestnut and 56th Sts. Philadelphia 39, Pa.

NEWS DEVELOPMENTS

ALUMINUM: 1958 WILL BE BANNER YEAR P. 51

Nonintegrated processors claim that there is a shortage of primary metal despite the fact that this is the greatest boom era in the history of the industry. Best year will be 1958 when all expansion projects will be operating at capacity.

U.S. TUNGSTEN STOCKPILE PROGRAM HIT P. 53

Philip McKenna, head of Kennametal, Inc., and owner of a Nevada tungsten mine, says federal price-pegging policy is shortsighted and unrealistic. We have enough of the mineral on hand for 20 peacetime or eight war years, he claims.

STEEL'S BIG PROBLEMS ARE STILL TO COME P. 54

Labor disputes may be out of the way but steel is not out of the woods. Serious shortages of plates and structurals will continue. Big automotive buying programs will tighten other products.

IRON ORE IMPORTS HELP AVERT SHORTAGE P. 56

Foreign ore will help fill gap left by strikes on the Great Lakes fleets.

Long strike at Pittsburgh. Steamship Div. may force U. S. Steel to transship big tonnages from East Coast ports.

◀ ELABORATE CARBIDE DIES like this are used to produce electric motor laminations. Accuracy, die life, high production are all factors favoring carbide dies for variety of applications. See summary below, story P. 91.

NEW NICKEL SOURCE FOR STEELMAKERS P. 60

A National Lead Co. subsidiary, Nickel Processing Corp., has begun production in the nation's only nickel refining plant at Crum Lynne, Pa. The plant gets its nickel oxide sinter from U.S.-owned mines at Nicaro, Cuba. Its commercial production is aimed at the steel market.

FEATURE ARTICLES

STAMPINGS: THE CASE FOR CARBIDE DIES P. 91

Carbide-dies, machined to gage-like accuracy, solve many a knotty cost or production problem in stamping and forming shops. Switch to these long-wearing dies usually means a better product at lower cost per piece. Other benefits: they minimize press down-time, resist damaging effects of misfeeds, other press aberrations. Though initially more costly, they offer long-run economy for precision, quality work.

HOW TO TAKE A MACHINE SHOP TIME STUDY P. 95

Accurate, fair work standards stem from intelligent time study observations. In turn, good time studies should be preceded by a careful job breakdown. Fortunately, machine shop operations generally fit rather well into specific work elements. But honest standards depend on a number of less clearly defined factors as well.

CONSTANT VACUUM UNIT TIGHTENS MELT SCHEDULES P. 98

The cost gap between vacuum- and air-melting narrows almost daily. Latest advance is an induction furnace designed for round-the-clock operation, if needed, under continuous vacuum. Already in pilot production, it will melt and pour up to 2000-lb ingots at 4-hour intervals.

LET ULTRASONICS PROBE FOR PROPER PART THICKNESS P. 100

As a reliable means for making fast, accurate checks on thickness of bulky or contoured parts, ultrasonic resonance testing is hard to beat. It's fast and dependable, and permits checks without removing work from the machine. And it's accurate—equivalent to micrometers in measuring thickness of skin-milled plates, for instance.

SIMPLE FEED INCREASES DEBURRING OUTPUT P. 104

The problem: find a better means for deburring transmission gears, cleanly and on a high-production basis. Answer: combine a fully automatic deburring machine with a simple, gravity-type handling chute feed. Resulting setup handles both internal, external gears.

MARKETS AND PRICES

TRACTOR INDUSTRY FACES SALES SLUMP P. 58

An estimated 34 pct drop in wheeled tractor sales poses a tough marketing situation for the nation's tractor producers. Increasing sales in tracklaying tractors offer some relief, but not enough. 1954 Census of Manufacturers provides basis for study. Industry's capital outlays are down.

20 MILLION NEW HOUSEHOLDS BY 1975 P. 59

Results of four projections conducted by the Census Bureau indicate that new households in the U. S. may increase at the rate of 700,000 to 1 million per year during the next 20 years. It's a good guide for companies which use household units as a measure of consumer demand.

CAPITAL LOOKS FOR STEEL PRICE HIKES P. 73

Speculation in Washington indicates that more steel price increases may be in the wind. It's suspected that the Administration's influence in keeping post strike increases at a minimum won't extend after elections.

M-DAY PROGRAM NO LONGER SHOOTING BLANKS P. 77

With 21 contracts already signed, and 5 more in final acceptance stages, the M-day program has finally gotten off the ground. If the trigger is pulled there will be 84 machine tool producers turning out 15,000 machines.

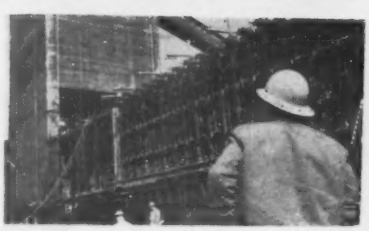
NEW AUTO ORDERS WILL TIGHTEN STEEL MARKET P. 139

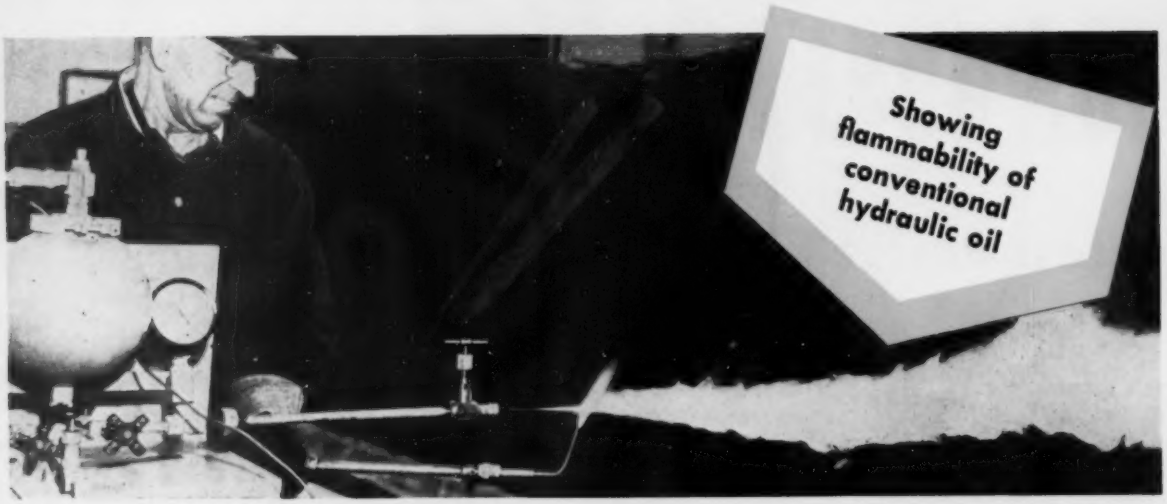
Automotive steel orders for November are expected to put the squeeze on any products that aren't already tight. No hope for structurals or plates. Inventories not in balance will cause a lot of trouble.

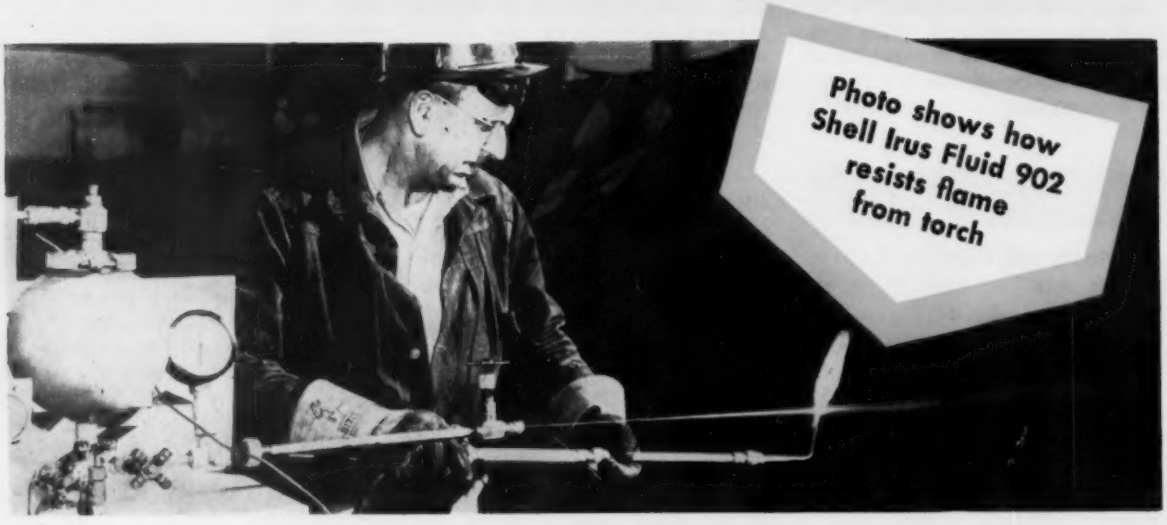
NEXT WEEK:

STEEL'S BIG PLANS FOR NEW CAPACITY

Steel expansion is going ahead at the rate of 15 million tons of increased capacity in the next three years. Next week's special report spells out, company by company, plans that mean more steel for the nation's steel users.







Flame tests prove its fire-snuffing ability

SHELL IRUS FLUID 902

Entirely new formula: Shell Irus Fluid 902 is a special formulation . . . product of three years' development and field testing. It is suitable for nearly all industrial hydraulic systems, as a direct replacement for presently used oils. *Here is a fire-resistant hydraulic fluid that can be widely used.*

Non-corrosive: Shell Irus Fluid 902 contains no corrosive ingredients. It has no harmful effects on seals, fittings or bearings. It does not promote rust.

No major modification necessary . . . simply clean present fluid thoroughly out of system and replace directly with Shell Irus Fluid 902. You can use it with complete confidence. Write for test data and all information.

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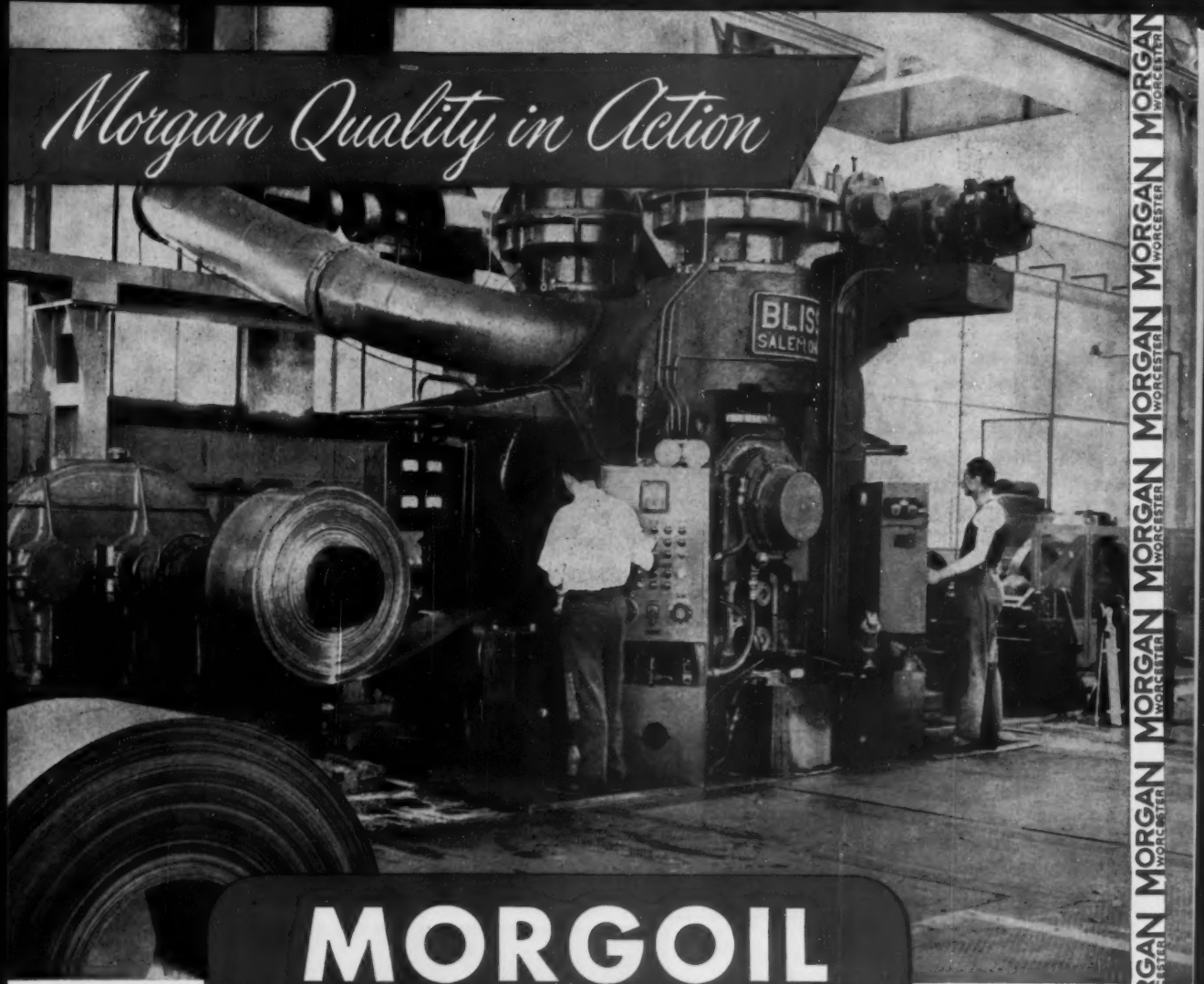
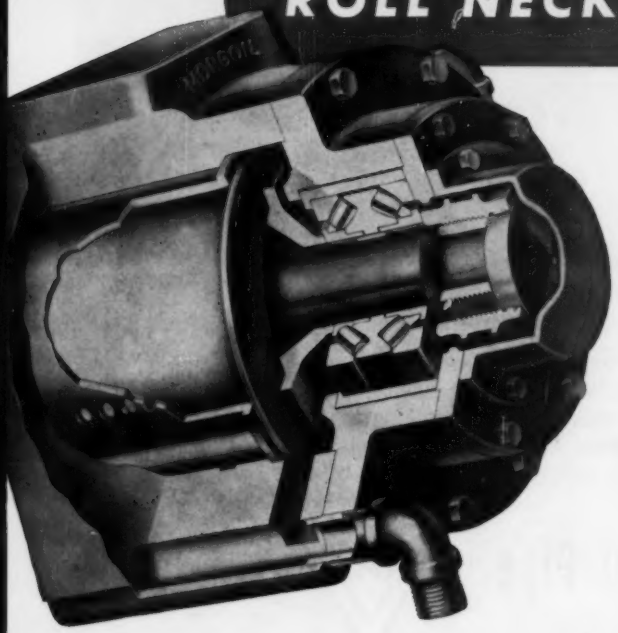
Morgan Quality in Action



MORGOIL
ROLL NECK BEARINGS



These 26"-90 MORGOIL Bearings are operating in a 10½" & 30" x 30" single stand four high reversing cold mill at Lombarde Falck in Milan, Italy. Hot mills or cold mills, ferrous or nonferrous, at home or abroad, MORGOILS give the best roll neck bearing performance at the lowest cost.

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ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS
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MB-30

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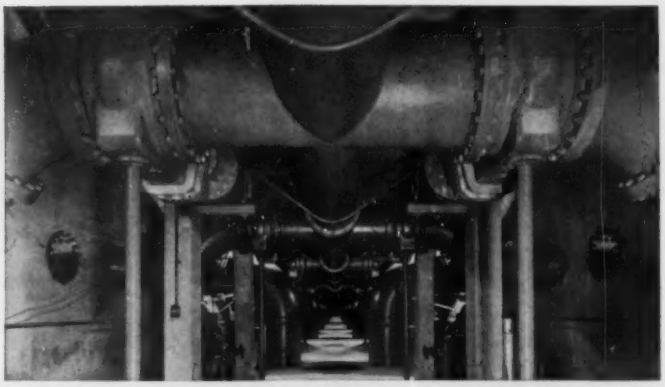
ARMCO PIPE CAN SAVE YOU TIME AND MONEY IN...

Plant Piping

You can easily meet your plant piping requirements with Armco Welded Steel Pipe. Standard and special fittings can be fabricated and attached to straight lengths of pipe to give you a perfect fit and easy installation. Field cutting and fabrication is no problem with easily welded Armco Pipe.

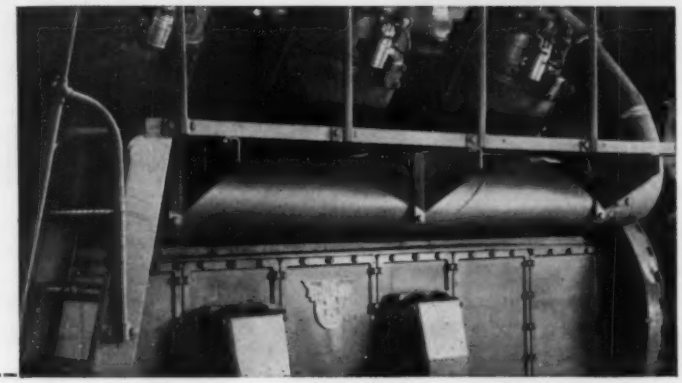


Supply Lines

Water supply lines, gas lines and similar installations go fast with long, 50-foot lengths of Armco Pipe. There are fewer sections to handle, fewer joints to make, fewer chances for leaks. For water supply lines, coatings are supplied to AWWA specifications with a spun enamel lining to prevent tuberculation.

Fabricated Products

Where product design requires a cylinder of uniform strength and roundness, many manufacturers have found it profitable to use Armco Pipe. Here Armco Pipe (beneath the service platform) serves as the air inlet manifold on a heavy-duty compressor unit.



Wide Size Range

You can take advantage of the wide size range of Armco Pipe to meet your specific needs. Diameters range from 6 to 36 inches, wall thicknesses from $\frac{9}{64}$- to $\frac{1}{2}$-inch.

Write to us for complete information. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 4336 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

EDITORIAL

Things Will Be Rough This Fall!

◆ IF YOU ARE LOOKING FOR a tea party in this election period, you had better leave the country. It is going to be one of the lustiest, toughest, no-holds-barred hassles since early FDR days.

If you are a top level industrialist, don't fall for the old dodge that all business men are Republicans. They aren't, even though they may be registered as such. If you are a labor big shot, don't think that all workers are Democrats. They aren't, even though many registered that way.

If you can keep your head while the viewers-with-alarm take over, you will make a profit next year. It makes sense—but not political sense—to say that no matter who "gets in" the country isn't going to the dogs. Don't do anything foolish businesswise in the several weeks before or after election.

Just hold on. Assume that business will be much better if the Republicans get in but it won't take a nose dive if the other party elects its man. It does no harm to point out that business is carried on for profit, not for political parties.

Don't let your fine sensibilities get ruffled when you hear about the health angle. Because, brother, you are going to hear about it. When the "campaign" is over, all of us will be able to pass an examination covering all the ailments that might affect us between now and when we hand in our check.

You will hear a lot about defense, high cost of living, foreign affairs and the "dangers" of young vice-presidents. It is well to hear all of this. But don't fall for the talk that we have lost our health, our leadership, our youth—or our common sense. It all comes out in the wash.

No matter whether you are a Republican or a Democrat, assume that both sides will have a tough job trying to win. This time it isn't going to be a walk-away. Complacency is eating at the Republicans and is beginning to affect the Democrats. And the Federal Reserve Board isn't doing the Administration any good with its high-level second guessing on the economy.

But after all it is labeled "Made in America." That's the most interesting part of the whole show. Positively, it happens nowhere else in the world.

Tom Campbell

EDITOR-IN-CHIEF

Is The Steel Industry Building A Brave New World

With Oxcart Methods?

A modern steel plant is a marvel of industrial efficiency. Something to amaze the casual visitor and make him understand why Steel is the backbone of our economy.

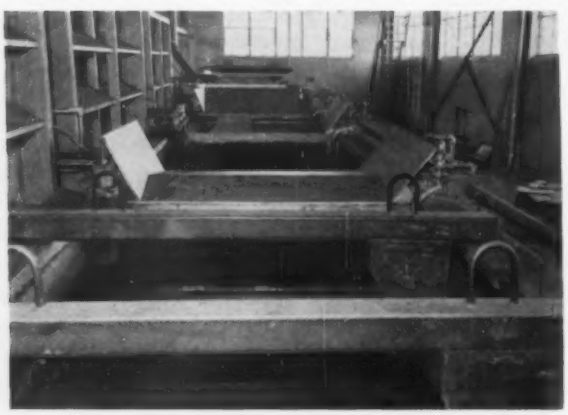
But Are Pickling Methods Up To Date?

Heating of pickling solutions, in some plants, is accomplished by methods which are basically related to the teakettle whistling away on a kitchen stove. With such methods fuel bills are inordinately costly; original equipment and installation are expensive; corrosion imposes a heavy toll.

By Contrast, Look What *SUBCOMCO*® Offers

- Lower acid cost because Submerged Combustion concentrates rather than dilutes the solution.
- Lower fuel costs because Submerged Combustion puts the heat *directly* into the solution.
- Less trouble with corrosion because there is no heat transfer surface to corrode.

We don't claim that Submerged Combustion is the best answer for pickling 100% of the time. We do say if you pickle metal in your plant, and haven't investigated Submerged Combustion, Inc. equipment recently, it may pay you to do so. We'll be perfectly frank. If we can't offer you important advantages we'll say so. If we can, we'll work with you to plan an improved pickling operation for your company.



A modern pickling operation using Submerged Combustion equipment to heat and agitate the solution.

A Subcomco® NOZ-L-MIX® burner like this one delivers 5,000,000 B.T.U.'s per hour. This burner is sufficient to handle a pickling tank 500 square feet in area.

Write for engineering data on pickling with Submerged Combustion

Submerged Combustion, *INC.*

HAMMOND, INDIANA

dear editor:

letters from readers

No "Phony" Here

Sir:

Congratulations on your editorial "Was the Steel Strike a Phony?"

It is a revelation to read an article by a person who has the courage of his convictions. I have contended right along that the steel industry, as a whole, should have taken a firm stand this year. . . .

Prices continue to soar which is not a healthy condition for even large consumers of steel, let alone small businesses like us. *F. H. Peabody, Purchasing Agent, C.K.L. Machinery Co., Oshkosh, Wis.*

Sir:

Your editorial in the August 9 issue, "Was the Steel Strike a Phony?" sort o' reassured me that there still are some honest people in the world. . . . *H. D. Hiatt, Indianapolis, Ind.*

Full Treatment

Sir:

We have recently seen your very comprehensive report on "Plating" (No. 5 of "How to Get the Most for Your Metalworking Dollar" series). Since this is one of the most thorough treatments of the subject we have seen, we would like to make it available to our Design Engineers.

Will you please send 10 reprints of the article to my attention? *R. Nagy, Assoc. Development Engineer, Aeronautical Div., Robertshaw-Fulton Controls Co., Anaheim, Calif.*

Nomograms

Sir:

The article entitled "What Ten Facts Form Operating Cost?" in your August 23 issue, describing a simplified machine tool replacement formula was extremely interesting but rather frustrating. How do I get a copy of these "Nomograms and instructions? *A. D. Kattelle, Asst. General Purchasing Agent, American Brake Shoe Co., New York, N. Y.*

Sir:

Please advise if further information and details are available on nomograms and equations for determining the 10 factors of machinery operating costs.

We would also appreciate your advice as to how we might obtain copies of Mr. Ottesen's paper on this subject which was presented to the ASME semiannual meeting. *P. B. Wall, Purchasing Agent & Plant Engineer, B. Blackinton & Co., North Attleboro, Mass.*

You may obtain copies of Mr. Ottesen's paper on the analysis of machine tool operating costs from: Order Dept., American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y. It would be best to specify the paper by its official ASME designation, which is No. 56-SA-2. Price per copy is 25 cents to Society members and 50 cents to non-members.—Ed.

Personal Profits

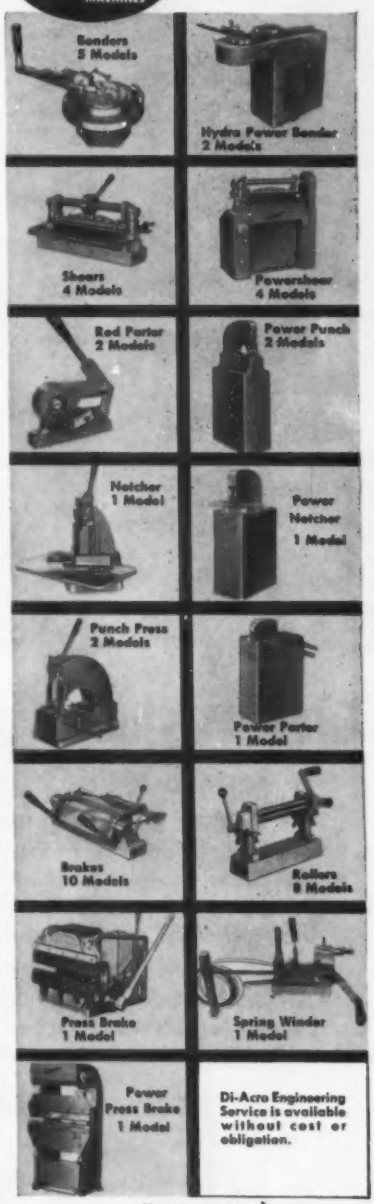
Sir:

I thoroughly enjoyed your article on "How to Get More for Your Handling Dollar" and believe that there are many such applications at my plant. I would, therefore, very much appreciate receiving a copy.

I might also add that I think IRON AGE is a superior magazine in its field enabling me to personally profit from its thought-provoking articles. *M. Karan, Product Engineer, Western Electric Co., Kearny, N. J.*

Speed FORMING and FABRICATING

di-acro PRECISION METALWORKING MACHINES for die-less duplicating



New 42 page catalog . . . packed with time saving "Die-Less Duplicating" techniques.

Consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or write us.

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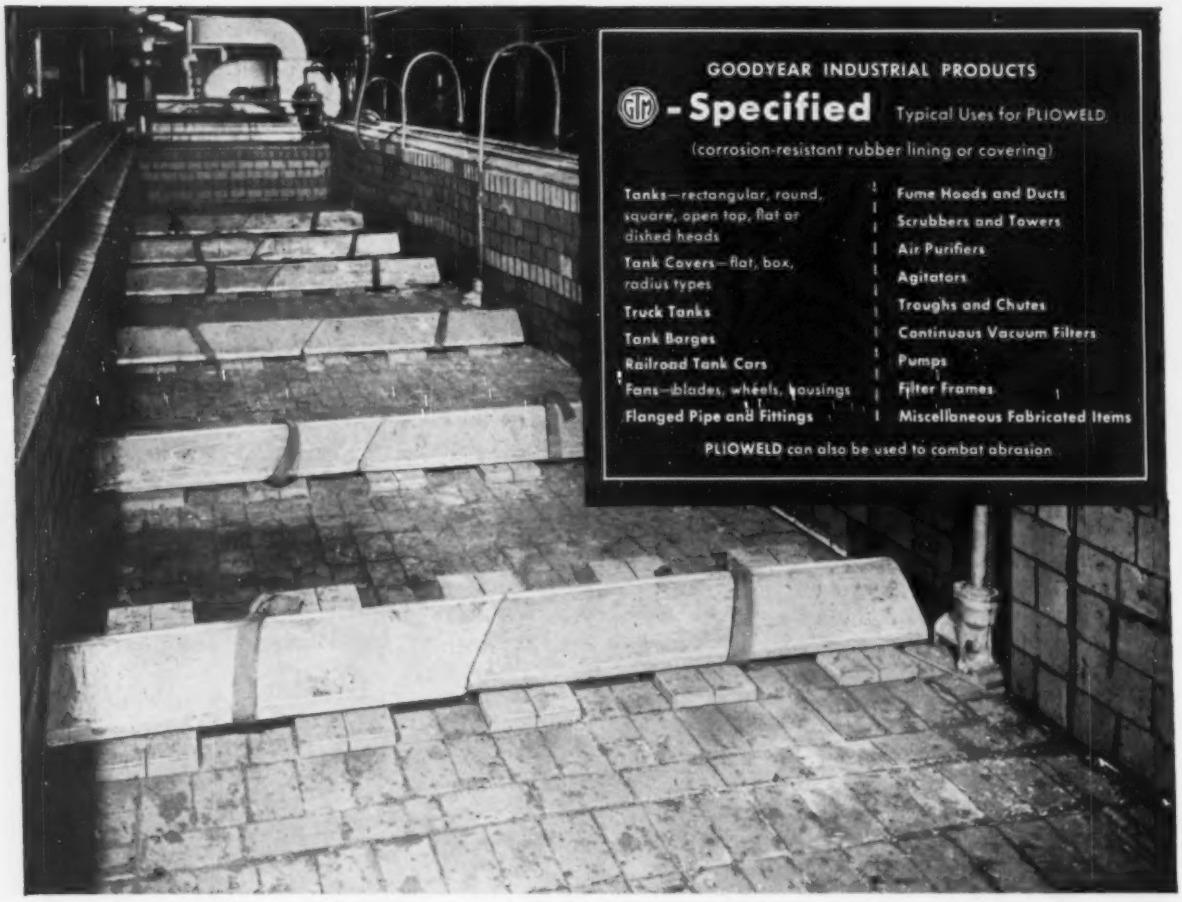
302 8th Ave. • Lake City, Minn.



G.T.M. reduces pickling tank maintenance by 66%

ALMOST weekly repair of a lead-lined, wooden pickling tank was a major problem for this Midwestern steel processor. Maintenance cost alone ran into the thousands of dollars every year. Moreover, the lead often stuck to the steel strip, causing additional problems.

Finally it was decided to install a steel tank. The G.T.M.—Goodyear Technical Man—recommended a PLIOWELD rubber lining plus two courses of acid-resistant brick. He also helped to develop a series of unique thermal expansion joints between the 40-foot tank sections. Result: *No shutdowns in two years*, except for normal cleaning—maintenance slashed to *one-third its former cost.*

Similar savings may be yours on any industrial rubber application by consulting the G.T.M. Contact him through your Goodyear Distributor, or write Goodyear, Industrial Products Division, Akron 16, Ohio.

PLIOWELD TANK LININGS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Plioweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

fatigue cracks

Lo, the Poor Publicist

There was a time when the publicity agent was a whomper-up of opinion for politicians, crackpots and shady financiers. This was some 50 years ago before industry and publicity were wedded in a shotgun ceremony just before the turn of the century.

Publicity has since become a very legitimate business. And though our editors do a lot of digging on their own there are important sections of industrial magazines which wouldn't be there were it not for the day-to-day work of these men: News of new products and plants, of promotions and the like. And the publicist often helps on background information, arranges meeting with engineers and other executives who must be interviewed for news and technical developments.

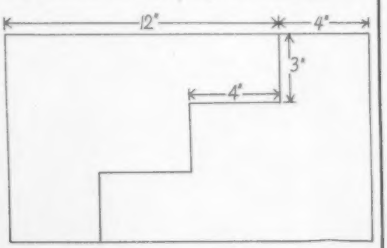
C. E. St. THOMAS: "No crackpots now."

Some publicists, that is. The art has come a long way in this century but there are still practitioners who don't know the score. Most of them are well-meaning people but they just don't know how to go about writing up what they have to say. And sometimes they write things better left unsaid.

It would be a great thing for editors—and for business—if all those who practice publicity knew its fundamentals. For this we now offer a remedy: We've just finished reading Charles E. St. Thomas on *How to Get Industrial and Business Publicity*. Charley is a friend of ours who has done an outstanding job of industrial publicity. This is not a stuffy book; there is no pontificating, no ivory tower talk. Just a simple outline of how a company goes about setting up a publicity operation either full or part time. He shows sample releases, simple, to the point, and devoid of the non sequiturs that clutter up so many amateur releases. We got our copy for free—but for $5 the budding publicist could hardly go wrong.

Puzzlers

Here's how you cut up the piece of lumber in the July 26 issue:



Winners: Charlsie and Letterman; D. C. Dunbar, National Steel Corp.; George W. Frederick, Republic Steel Corp.; John Homer, Jr., James Young and Henry Buresh, Collins Radio Co.; Jim Stockton, C. I. Crais Co.; C. A. Ward; Florence Thompson, Kaiser Aluminum & Chemical Corp.; W. C. Cook, Nabors Trailers; Ole Abe Raich, CF & I; G. L. Urick, Kirsch Co.; Frank M. Forte, The Viking Tool & Machine Corp.; and Wm. J. O'Connell.

New Puzzler

A beekeeper had a new box for a hive and at 8 a.m. he placed one bee in the hive. Every minute thereafter he doubled the number of bees placed into the hive and at 12 M the hive was full. When was the hive half full? When was the hive one quarter full?

Many thanks to E. A. Baines for this one.

PERFORMANCE Makes Gears EASIER TO SELL

REPRESENTATIVE, THE CINCINNATI GEAR CO.

Often when calling on a new customer after his first gear order has been assembled and is in test operation, he will tell me something like "finest gears we ever used — certainly improved operating qualities of our product — no trouble in assembly, no vibration, they are as quiet as a precision watch". This customer is just learning what Cincinnati Gear's older customers already know, and what I've known for the thirteen years I've represented Cincinnati Gear in the Cleveland area: that we make *ONLY GOOD GEARS* — gears that give 100% performance at all times. If, by chance, there is an error, there is never a compromise; the gear is promptly replaced.

This pleases our customers, of course, but it also pleases me — and gives me the confidence in our firm and our product that I need to do a first-rate selling job. This confidence, I feel, is about the most valuable "sales aid" I have. I can solicit an order and know full well that the gears shipped will deliver performance desired — and result in the kind of customer satisfaction that leads to repeat orders. I can't think of anything that makes my job easier.

THE CINCINNATI GEAR CO.
CINCINNATI 27, OHIO
"Gears—Good Gears Only"

CINTI

CINCINNATI
BICKFORD
SUPER SERVICE
Radials

For faster metal drilling . . .

This ultra-modern head . . . CHARTS and PRE-SELECTS PROPER SPEEDS and FEEDS

Built in 4 foot to 8 foot arm, 13 inch to 19 inch column. Spindle speeds may be as low as 8 RPM or as fast as 1750 RPM.

You chart, you control, you speed up operations and have a record for reference with this advanced head. The prescheduling chart plans sequence of operations and is a complete guide for the operator. Instant, quiet, hydraulic selection and changes of 36 speeds and 18 feeds are preselected by two convenient, easily read dials. Controls for clamping of column, arm and head, and arm elevation by power are at the operator's finger tips.

Write for Bulletin R-33 describing this ultra-modern tool

CINCINNATI BICKFORD

SUPER C B SERVICE

G&L

RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION

GIDDINGS & LEWIS MACHINE TOOL COMPANY

OAKLEY, CINCINNATI 9, OHIO, U.S.A.

dates to remember

SEPTEMBER

American Society for Testing Materials—Second Pacific area national meeting and apparatus exhibit, Sept. 16-21, Hotel Statler, Los Angeles. Society headquarters, 1916 Race St., Philadelphia.

Instrument Society of America—Eleventh annual international instrument-automation conference and exhibit, Sept., 17-21, New York Coliseum, N. Y. Society headquarters, 1319 Allegheny Ave., Pittsburgh.

American Hot Dip Galvanizers Assn.—Semi-annual, meeting, Sept. 19-21, Greenbrier Hotel, White Sulphur Springs, W. Va. Assn. headquarters, 1806 National Bank Bldg., Pittsburgh.

EXPOSITIONS

Assn. of Iron & Steel Engineers, Sept. 25-28, Cleveland.

Metal Show—Oct. 8-12, Cleveland.

Steel Founders' Society of America—Fall meeting, Sept. 24-25 The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 606 Terminal Tower, Cleveland.

The Material Handling Institute—Fall meeting, Sept. 24-26, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 813 Clark Bldg., Pittsburgh.

The Atomic Industrial Forum—Second annual trade fair, Sept. 24-28, Navy Pier, Chicago. Society headquarters, 260 Madison Ave., New York.

OCTOBER

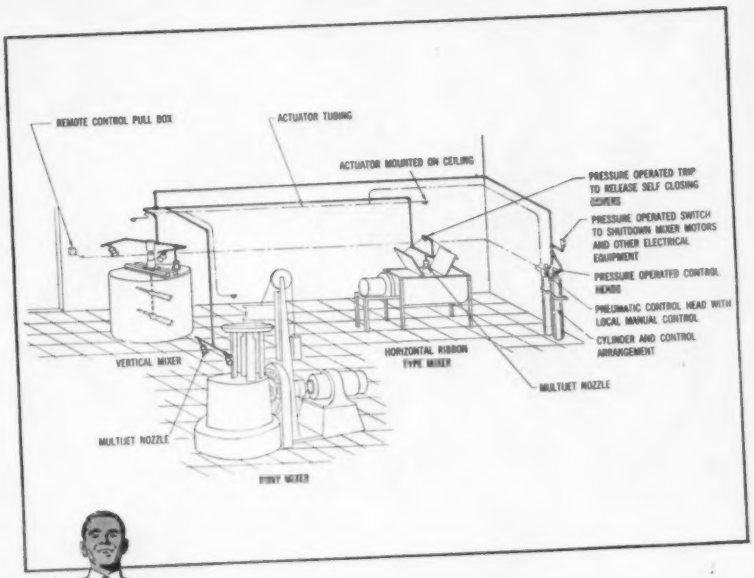
American Institute of Electrical Engineers—Fall general meeting, Oct. 1-5, Morrison Hotel, Chicago. Society headquarters, 36 W. 46th St., New York.

Society of Automotive Engineers, Inc.,—National aeronautic meeting, Oct. 2-6, Hotel Statler, Los Angeles, Calif. Society headquarters, 29 W. 39th St., New York.

Standard Engineers, Society—Fifth annual meeting, Oct. 3-5, Hotel Willard Washington, D. C. Society headquarters, P. O. Box 281, Camden, N. J.

The Magnesium Assn.—Twelfth annual convention, Oct. 4-5, The Drake, Chicago. Society headquartes, 122 E. 42nd St., New York.

The Material Handling Institute, Inc.—Fall meeting, Oct. 10-11, The Traymore Hotel, Atlantic City, N. J. Society headquarters, One Gateway Center, Pittsburgh.


REMOTE CONTROL PULL BOX
ACTUATOR TUBING
ACTUATOR MOUNTED ON CEILING
PRESSURE OPERATED TRIP TO RELEASE SELF CLOSING COVERS
PRESSURE OPERATED SWITCH TO SHUTDOWN MIXER MOTORS AND OTHER ELECTRICAL EQUIPMENT
PRESSURE OPERATED CONTROL HEADS
PNEUMATIC CONTROL HEAD WITH LOCAL MANUAL CONTROL
CYLINDER AND CONTROL ARRANGEMENT
VERTICAL MIXER
HORIZONTAL RIBBON TYPE MIXER
MULTIJET NOZZLE
MULTIJET NOZZLE

FULL-TIME FIRE PROTECTION... CUSTOM-ENGINEERED FOR INDUSTRIAL MIXERS!

SPECIAL HAZARDS—like industrial mixing vats shown in the diagram above—deserve special fire protection . . . the *custom-engineered* kind of fire defense that you get with a Kidde CO_2 Fire Extinguishing System!

Fully automatic, the Kidde system provides *'round-the-clock* protection . . . insures full-time security even in case of outside power failures. Rate-of-temperature-rise detectors spot the first sign of flame, and cause Multijet nozzles to discharge fire-smothering carbon dioxide that stifles the blaze in seconds. At the same time, the Kidde system switches off fans and machinery and sounds an alarm.

All moving parts of a Kidde system are self-enclosed to prevent accidental discharge. Easy-to-read visual indicators show at a glance whether the system is "set" or "released." And Kidde Directional Valves let you guard more than one hazard from the same cylinder bank, providing completely versatile fire protection.

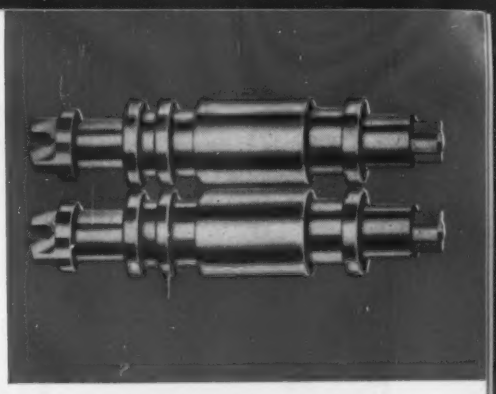
Don't settle for anything less than the *best* in fire protection. For more information about your specific problem, write Kidde today.

Kidde

Walter Kidde & Company, Inc.
949 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd., Montreal—Toronto

CONTINENTAL

CONTINENTAL 40-inch, 2-high reversing blooming-slabbing mill in the Fairless Works of the United States Steel Corporation.



ROLLS—iron, alloy iron and steel rolls for all types of rolling mills.

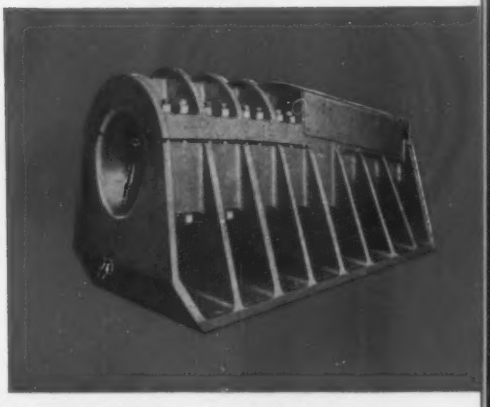
BLAW-KNOX

makes what it takes

to handle tough

blooming-slabbing

operations



CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.

In operation as an intermediate mill for subsequent rolling, this rugged Continental 40-inch reversing blooming-slabbing mill is providing excellent performance in the United States Steel's Fairless Works.

Variations of the basic design of this mill are built by Blaw-Knox to serve as break-down mills for billet and bar mills, rail and structural mills, and merchant mills.

Blaw-Knox designs and builds complete rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

WELDMENTS—fabricated steel plate, or cast-weld design.

50th Anniversary
BLAW-KNOX
1906-1956

CONTINENTAL Foundry & Machine

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division

Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Complete Rolling Mill Installations . . . including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • rail mills • billet mills • rod mills • merchant mills • roll lathes • chippers • special machinery • and complete auxiliary equipment

60 second tour

shows it in a nutshell . . .

All-Inclusive Spring Service

COMPRESSION SPRINGS
Regular, Double

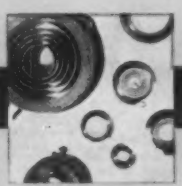
COMPRESSION SPRINGS
Special Shapes
Variable pitch

VOLUTE SPRINGS
Coned end

EXTENSION SPRINGS
Special Hooks
and Loops

EXTENSION SPRINGS
Swivel End
Drawbar

TORSION SPRINGS
Single, double
Edge wound

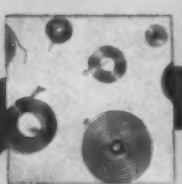


POWER SPRINGS
Clock or Motor

FLAT SPRINGS
Arched, Curved-beam
Elliptical

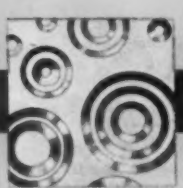
CLIPS, CLAMPS
and COLLARS

FASTENERS and
RETAINERS



HAIRSPRINGS
for Instruments
Gauges, etc.

SPRING WASHERS
Wavy, Star, Finger,
Expander, etc.



BELLEVILLE SPRINGS
In Series, Parallel
Parallel-series

DIAPHRAGMS
Discs, Plates

PLUS
COLD-ROLLED
SPRING STEEL

WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT

THE WILLIAM D. GIBSON COMPANY
1800 CITYBOURN AVE.
CHICAGO 14

RAYMOND Manufacturing COMPANY
CORRY, PENNSYLVANIA

BARNES-GIBSON-RAYMOND
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PLYMOUTH, MICH.

B-G-R COOK PLANT
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MICHIGAN

DIVISIONS OF ASSOCIATED SPRING CORPORATION
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OHIO DIVISION
1925 EAST FIRST ST.
DAYTON, OHIO

WALLACE BARNES COMPANY
STATE FAIR BLVD.
SYRACUSE 9 [illegible]

MILWAUKEE DIVISION
341 E. ERIE ST.
MILWAUKEE, WIS.

DUNBAR BROTHERS COMPANY
BRISTOL, CONN.

F. N. MANROSS AND SONS CO.
BRISTOL
CONNECTICUT

THE WALLACE BARNES CO., LTD.
HAMILTON
CANADA

Divisions of

ASSOCIATED SPRING CORPORATION

REMEMBER THE TIME—

Mack Sparkled Afield for Tribe

Ray Mack wore a magic glove while performing at second base for the Indians in the '40s.

Never a great hitter, Mack compensated for this with his brilliance afield. He possessed a cannon in place of a right arm and executed the doubleplay with incomparable finesse.

Never was his talent so fully exploited than in Feller's opening day no-hitter against the White Chicago's Comiskey Park in 1940.

With two outs in the ninth and Feller one m immortality, Taft Wright, an outfielder, first base line. Mack raced ... grou...

You'll cheer, too, when you see the newest star in the materials handling big leagues . . . the Wellman Locomotive Crane. In its first few months of action, this power-packed performer has won fans by the hundreds among men who specify in steel plants, railroad terminals, scrap yards, paper mills. And no wonder! The new Wellman Locomotive Crane offers these outstanding features:

BALL RACE ROTATION...eliminating center pin construction, delivering smoothest operation.

TORQUE CONVERTER DRIVE...combining diesel electric power with hydraulic torque conversion.

POWER-POSITIONED A-FRAME...positive, simple adjustment of crane bail for heaviest loads on extra long booms.

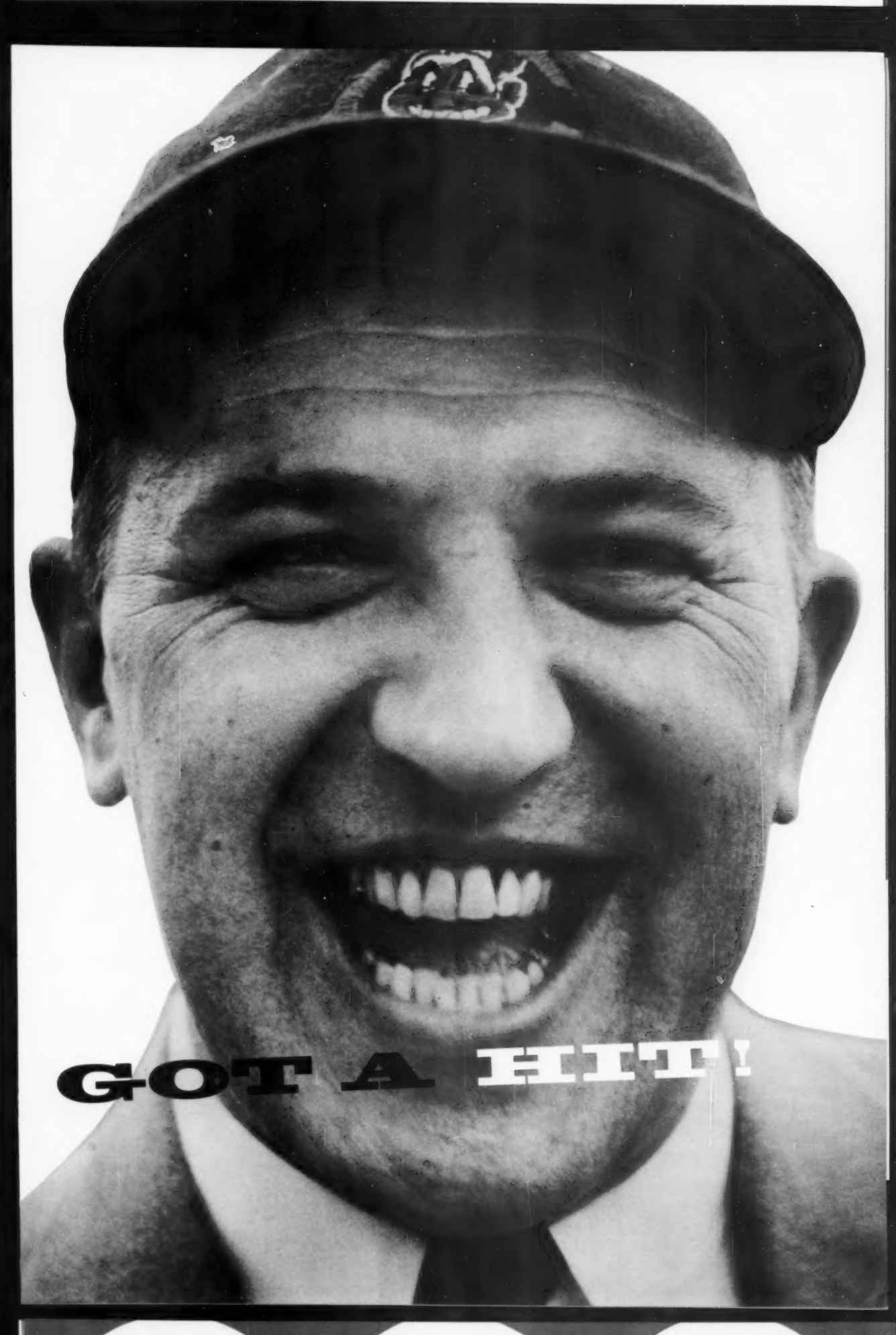
PLUS CAPACITIES FROM 25 TO 80 TONS...speeds to 15 miles an hour...extra-full-vision for operator...true air-powered brakes on hoist drums...push-button control for main disconnect clutch...all anti-friction bearings...many more exclusive features.

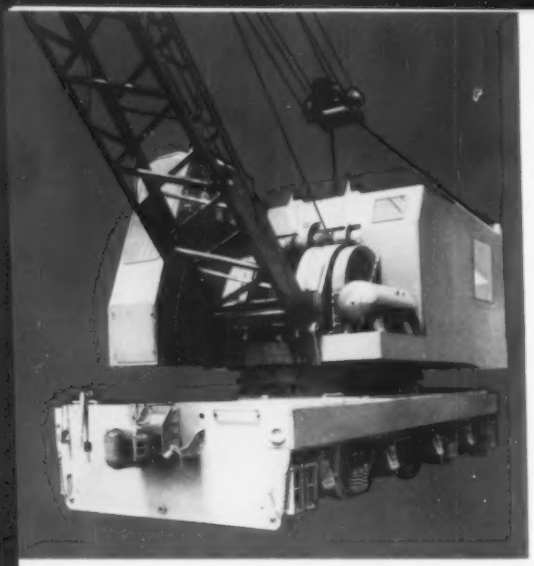
Ray Mack, former star second baseman for the Cleveland Indians, is a vice president of The Wellman Engineering Co. and general manager of its Locomotive Crane Division. His ten years in baseball began in 1938, the year he graduated from Case Institute of Technology in Cleveland as a mechanical engineer.

RAY MACK'S

Ray Mack will be at the Iron & Steel Exposition in Cleveland's Public Auditorium from September 25 through September 28. Look for the man with the biggest grin . . . and the finest locomotive crane ever built.*

**BOOTHS 216, 217, 218, 223, 224, 225*


GOT A HIT!



WELLMAN LOCOMOTIVE CRANES*

*SUCCESSORS TO BROWNING LOCOMOTIVE CRANES

Engineered and Built for Railroads . . . Steel Mills . . . Pulp and Paper Plants Scrap Yards . . . Terminals and Ports . . . Sand and Gravel Plants

The Wellman Engineering Co., now in its 60th year of service to basic industry, also produces complete heavy bulk materials handling plants and systems . . . steelmaking machinery . . . heavy hoisting equipment . . . the complete line of Williams contractors clamshell and dragline buckets and special industrial buckets . . . Anker-Holth air and hydraulic power cylinders in standard and special sizes and designs.

a McDowell enterprise

LOCOMOTIVE CRANE DIVISION
THE WELLMAN ENGINEERING COMPANY

7000 CENTRAL AVENUE · CLEVELAND 4, OHIO

THE McDOWELL FAMILY OF RELATED ENTERPRISES

McDowell Turnkey Plants • Dwight-Lloyd Research Laboratory • Wellman Bulk Materials Handling Systems and Steelmaking Machinery • Anker-Holth Power Cylinders • Dwight-Lloyd Ore Beneficiating Plants • ABCs Belt Conveyor Scales • Williams Buckets • Wellman Locomotive Cranes

---

Locomotive Crane Division
The Wellman Engineering Co.
7000 Central Ave., Cleveland 4, Ohio

Please send BULLETIN WL-201 describing the new Wellman Locomotive Cranes in detail.

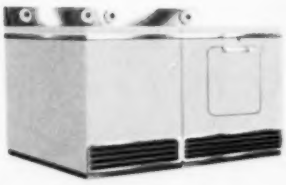
NAME ..... TITLE .....

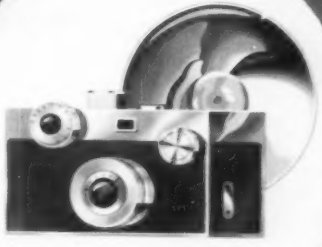
COMPANY .....

STREET .....

CITY ..... ZONE ..... STATE .....

what do all
these modern products
have in common?
*





they're trimmed with the

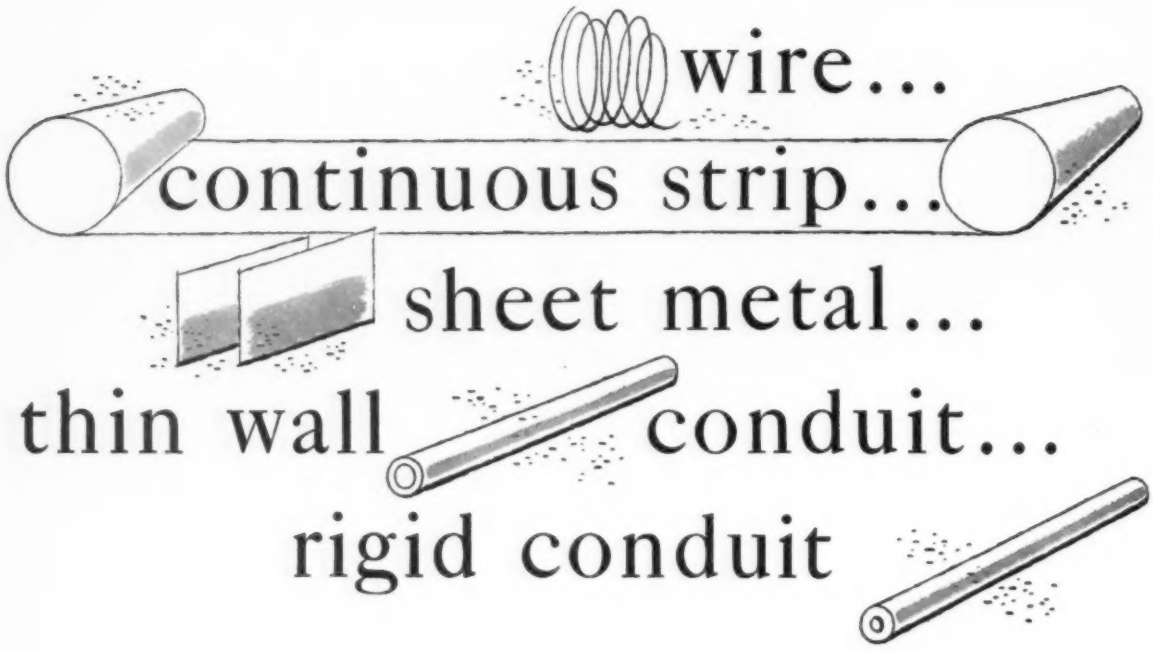
* permanent beauty and durable utility of **stainless steel**

Beauty with a lifetime shine! Outdoors or in, stainless steel adorns as it resists wear and corrosion—protects equipment against rubs, dents and scratches—puts *selling highlights* on car, counter and camera alike. Stainless is solid-bright. Can't wear off, pit or peel. Design for stainless and specify it always, for faster product profit!

Superior
stainless strip steel

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

IF YOU PROCESS...



YOU CAN *Automate* ALL THESE OPERATIONS:

- cleaning
- bonderizing
- pickling
- scrubbing
- plating
- paint prep
- electrogalvanizing

For Faster, Better Production . . . At Far Less Cost
with an

H-VW-M CONTINUOUS LINE SYSTEM

WRITE today, at no obligation, for the facts about an H-VW-M System that can bring cost-saving *automation* to your continuous line finishing—a system that can be integrated with your shearing, forming, slitting or annealing operations.

PLATEMANSHIP

Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, N. J.
Plants: Matawan, N. J. • Grand Rapids, Mich.
SALES OFFICES: Anderson (Ind.) • Baltimore • Beloit (Wisc.) Boston • Bridgeport • Chicago • Cleveland • Dayton • Detroit Grand Rapids • Los Angeles • Louisville • Matawan Milwaukee • New York • Philadelphia • Pittsburgh • Plainfield Rochester • St. Louis • San Francisco • Springfield (Mass.) Utica • Wallingford (Conn.)

3515

H-VW-M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

SEE THE *NEW* LINE OF GENERAL ELECTRIC

CLOSED CIRCUIT TELEVISION

Demonstrated at the Iron and Steel Exposition, Cleveland, in Booths 278-283, September 25th through the 28th.

It's the VISUAL COMMUNICATION SYSTEM designed to meet the exacting standards of industrial applications where remote observation and surveillance is of prime importance to production.

ASK FOR

...complete specifications and Application Engineering Counsel on how you can apply "Intra-Tel" closed circuit television to your business. Get details on the wide applications to which the new General Electric system lends itself.

SEND FOR

...the free booklet that explains the "Intra-Tel" system if you can't make the Exposition. Write for Booklet ECL-53, General Electric Company, Industrial Electronics Division, Broadcast Equipment, Electronics Park, Syracuse, New York.

Progress Is Our Most Important Product

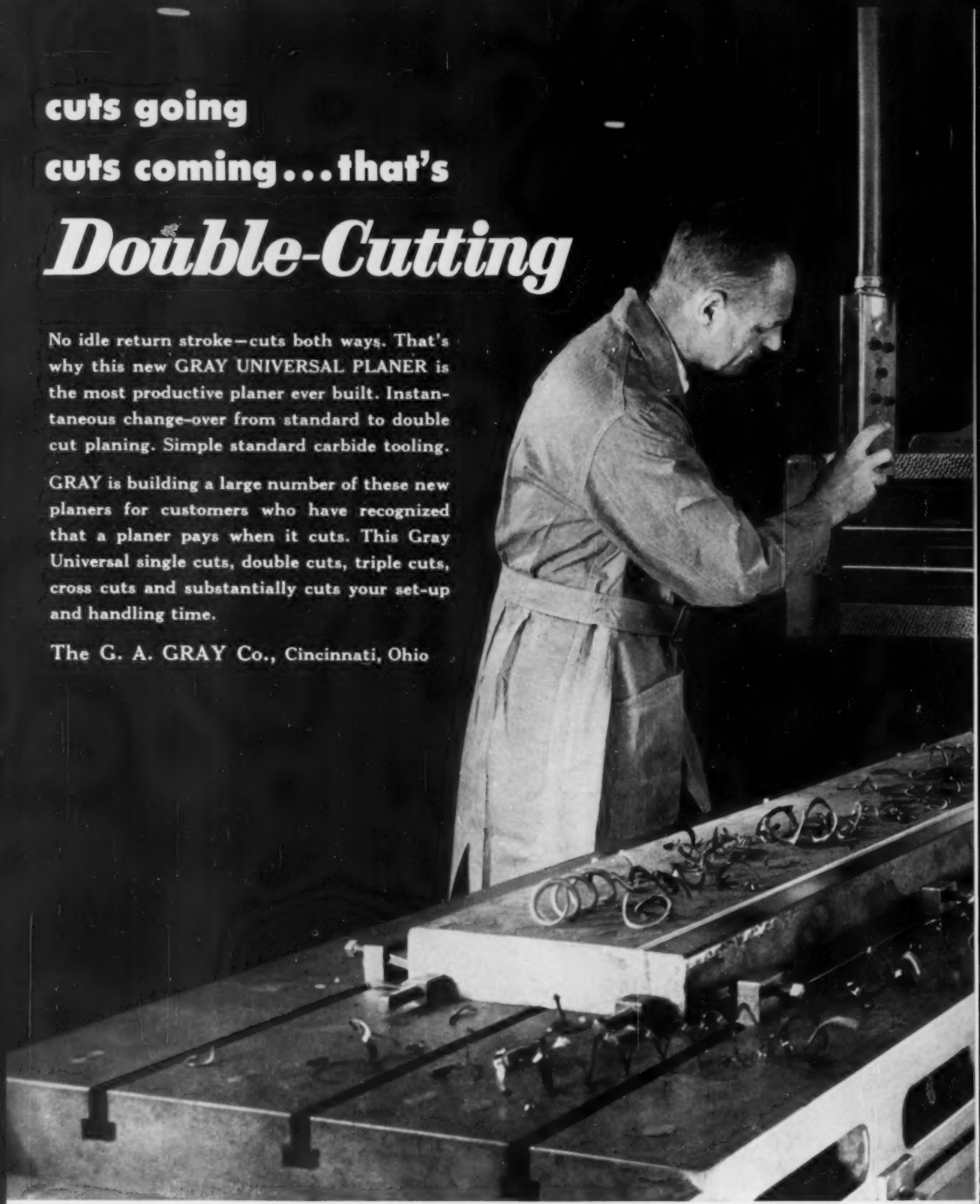
GENERAL ELECTRIC

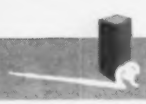
cuts going
cuts coming... that's
Double-Cutting

No idle return stroke—cuts both ways. That's why this new GRAY UNIVERSAL PLANER is the most productive planer ever built. Instantaneous change-over from standard to double cut planing. Simple standard carbide tooling.

GRAY is building a large number of these new planers for customers who have recognized that a planer pays when it cuts. This Gray Universal single cuts, double cuts, triple cuts, cross cuts and substantially cuts your set-up and handling time.

The G. A. GRAY Co., Cincinnati, Ohio



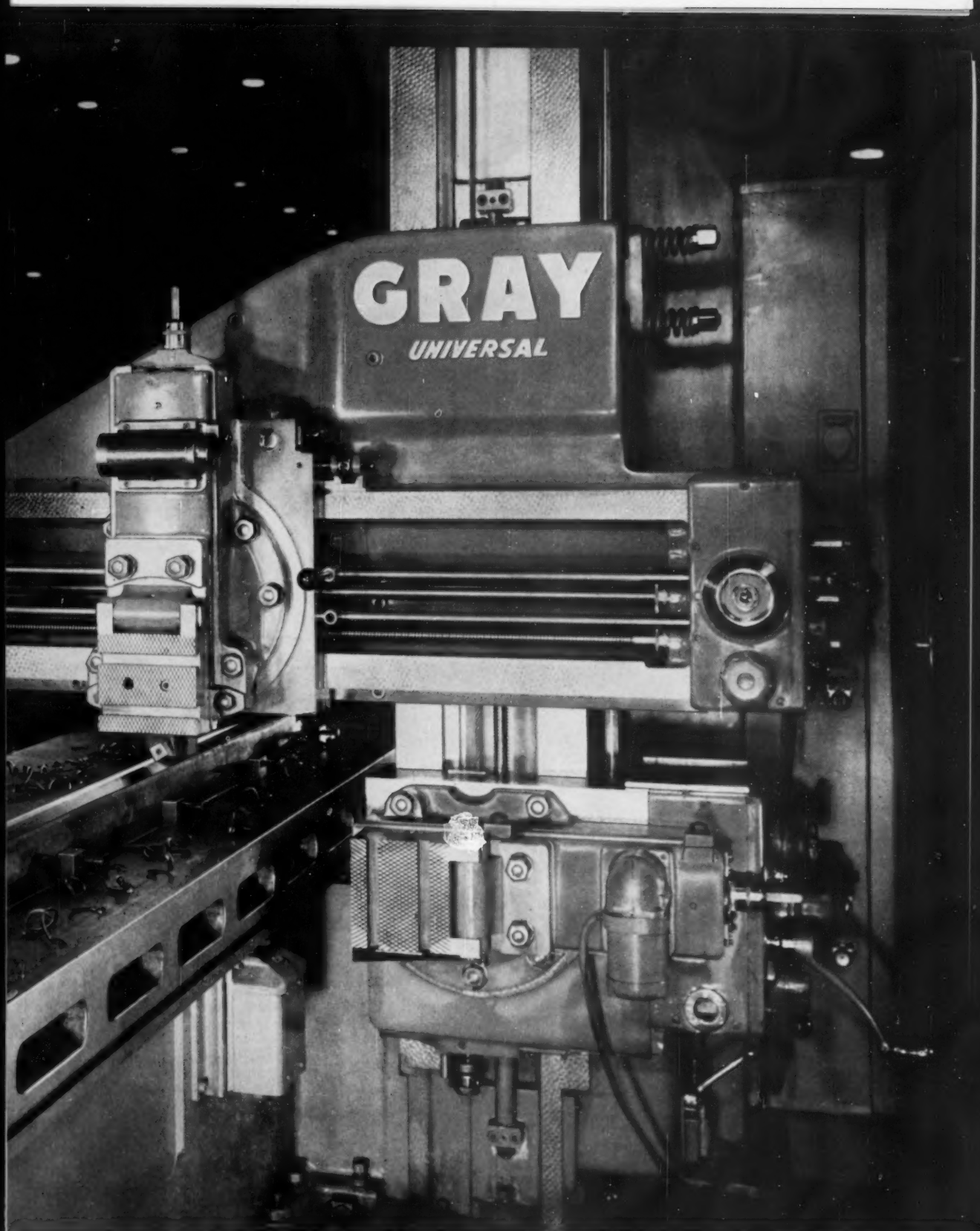


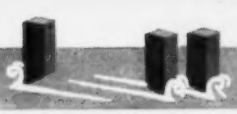
heavy-duty planing

The Gray Universal is the world's most powerful planer available for conventional planing. Its rigidity and speed are ideally suited for modern carbide cutting.

double cut planing

The flick of a lever, the touch of a button permits double cutting. Elimination of the idle stroke insures the world's most efficient flat surface machining. Only simple carbide tools are required.



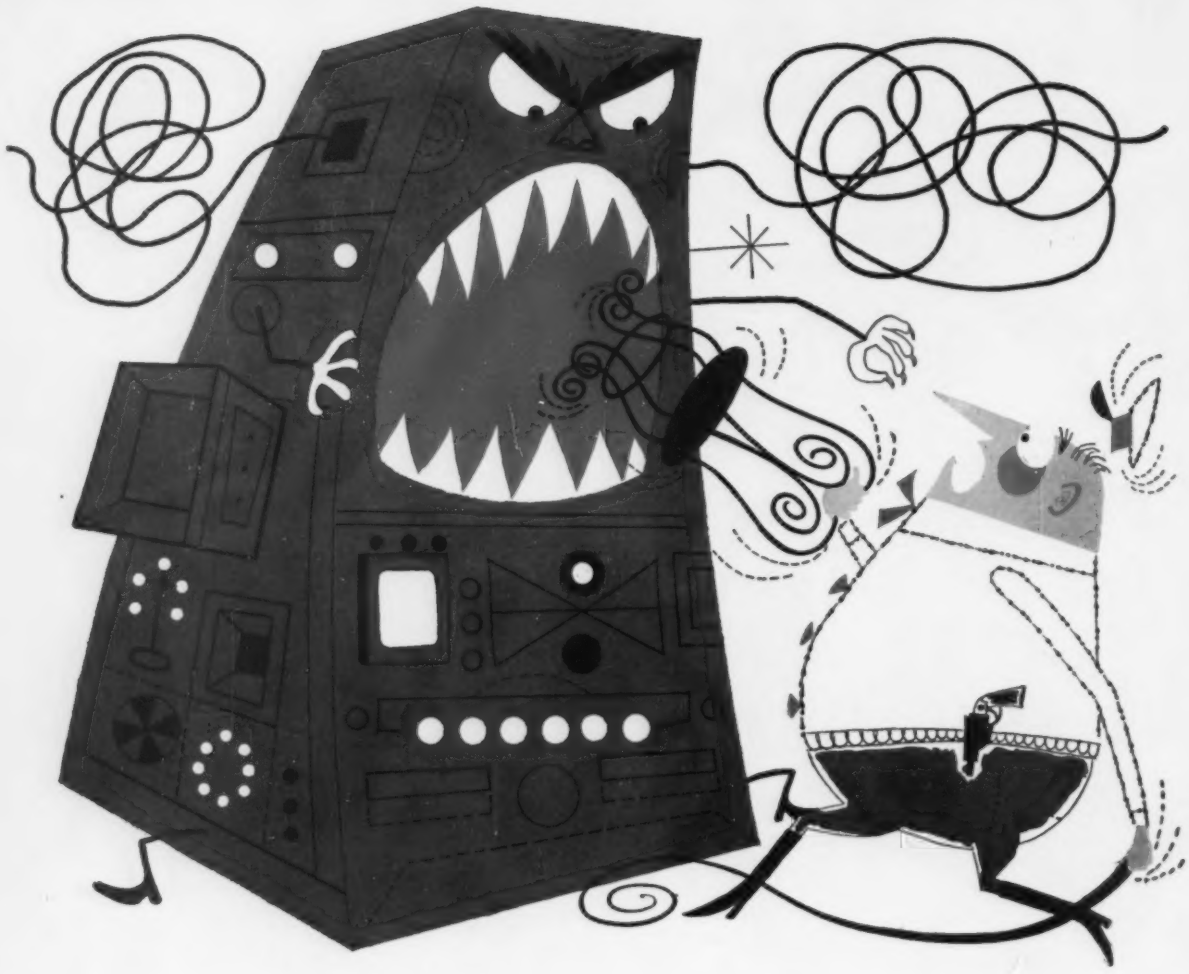


triple cut planing

Rough and rough-finish plane at the same time. Rough by double cut planing and simultaneously rough-finish with a single point tool. Then finish plane without a tool change.

cross planing

Eliminates extra settings by cross planing the occasional keyways, chamfered corners, and other troublesome small cross surfaces that formerly added hours to your set-up time.



Taming a wire fabricating machine?

Call American Steel & Wire!

Wire machines can be ornery. They seem to have a brain that delights in fouling up a high speed production line.

Very frequently, your American Steel & Wire representative can tame things down. With over a century of company experience behind him, he may be able to suggest a minor change in wire specifications, die construction or fabricating procedure that will solve the problem.

At AS&W, we *use* a lot of wire in our own plants, and have learned a lot of little tricks that are yours for the asking. Just call your American Steel & Wire representative.

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USS AMERICAN MANUFACTURERS WIRE

USS

AMERFINE—*high quality fine wire.*
AMERSPRING—*music steel spring wire.*
AMERTEMP—*heavy-duty oil-tempered wire.*
AMERLOY—*alloy heading wire.*
AMERHEAD—*uniform heading wire.*
AMERSTITCH—*extra-tough metal stitching wire.*

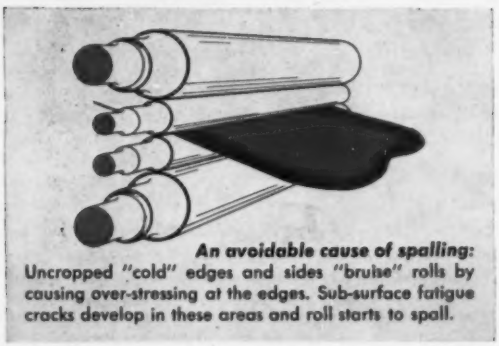
UNITED STATES STEEL

TIPS FROM A ROLL MAKER'S NOTEBOOK

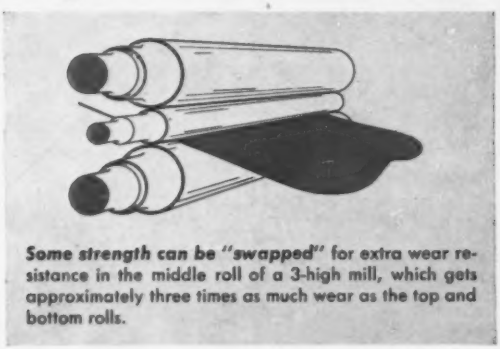
MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

How to get longer life from plate mill work rolls



An avoidable cause of spalling: Uncropped "cold" edges and sides "bruise" rolls by causing over-stressing at the edges. Sub-surface fatigue cracks develop in these areas and roll starts to spall.

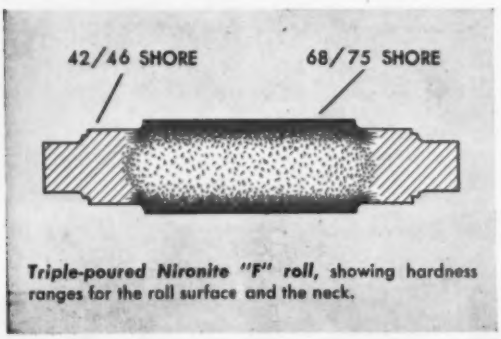


Some strength can be "swapped" for extra wear resistance in the middle roll of a 3-high mill, which gets approximately three times as much wear as the top and bottom rolls.

In plate mill work rolls, the balance of strength-vs.-hardness varies with the type of mill, the stand, and the rolling stresses involved. In general, however, the harder the rolls, the better.

This is particularly true of the work rolls in a 4-high mill and of the middle roll in a 3-high mill when used for finishing passes. On the other hand, the absence of grinding facilities in some plants often puts a limit on hardness, since the rolls must be soft enough to machine.

Spalling and fire cracking – With the many suitable combinations of mechanical properties available today, the life expectancy of a cast iron plate mill work roll depends largely on its resistance to fire cracking and spalling. And the current demand for good plate finish has placed even more emphasis on roll surface condition.



Triple-poured Nironite "F" roll, showing hardness ranges for the roll surface and the neck.

Three kinds of iron in a single roll – Mack-Hemp metallurgists have answered all these requirements in the *Nironite "F"* roll, a high-alloy grain-type roll.

Nironite "F" rolls are always double-poured, and sometimes even triple-poured. The deep outer shell is nickel-chromium alloy iron—very hard, very dense, and highly resistant to fire cracking. The second metal, a soft gray iron, provides the strength and resistance to impact needed in the core. Finally, the necks of all large Mack-Hemp plate mill rolls are cast with a third alloy whose carbon content is closely controlled. This third pour eliminates the tendency to weakness and coarse grain structure often encountered in the necks of double-poured plate mill rolls (a result of the slow cooling rate of the large mass of metal in the necks). It provides increased strength and a fine grain structure that prolongs the life of the roll neck bearings.

Another Nironite grade—*Nironite A*—is also widely used for work rolls in many plate mills. A single-poured cast iron grain roll of slightly lower alloy content than the iron of the first pour in Nironite "F" rolls, it provides excellent strength properties at somewhat lower hardness levels.

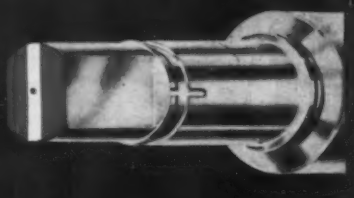
No matter what type of rolling you do . . . ferrous or non-ferrous . . . Mack-Hemp roll engineers and metallurgists can help you with your special problem. Simply write Mackintosh-Hemphill Division, E. W. Bliss Company, 901 Bingham Street, Pittsburgh 3, Pa.

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



These turboprop propeller blades

Model CT634S of the Curtiss-Wright Turbolectric series was the first U. S.-designed and built turboprop propeller to be certificated for commercial use by the Civil Aeronautics Administration. This model and others are already in quantity production for military aircraft.

Turbolectric propellers use extruded hollow steel blades produced by the controlled extrusion process developed by Curtiss-Wright. The extruded blade begins as a single-piece alloy steel billet.

With the development of this propeller and the controlled extrusion process came the need to select the right alloy steel. And here's where teamwork paid off.

Republic metallurgists, working closely with Curtiss-Wright metallurgists and engineers, selected an alloy steel with the following properties that make the extrusion process successful from both a production and cost standpoint: freedom from imperfections, uniform response to heat treatment, workability in all stages, weldability, bendability—hot or cold.

These properties in combination with the extrusion process give:

(1) IMPROVED STRENGTH-WEIGHT RATIO. The tough, integral structure of the extruded alloy steel blade provides greater strength and resistance to fatigue with minimum weight.

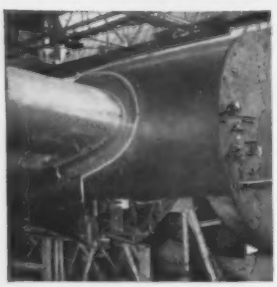
(2) IMPROVED QUALITY. Greater uniformity is assured by fabricating from a single homogeneous material.

(3) INCREASED PRODUCTION. The number of manufacturing operations is reduced. Production per hour is increased. Floor space is saved.

(4) REDUCED COST. Less steel for original stock, less machining, and lower cost tooling and equipment are required. Expensive welding and accompanying preheating and post-heating operations, as well as milling operations, have been reduced.

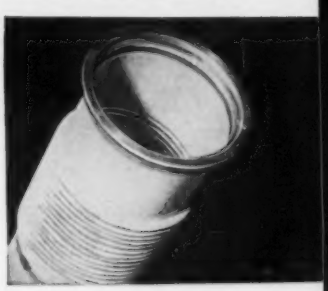
What about your product? Are you using the right steel in the right place? Republic—world's largest producer of alloy and stainless steels—offers you the services of experienced field metallurgists who will work with your staff in determining where these versatile steels can effect the greatest savings. Just send us the coupon.

Strength-to-Weight or Heat Problems—Republic Has the Answers



◀**TITANIUM SAVES WEIGHT ON DC-7** with no sacrifice in strength or safety. Republic is an old hand at this high strength-to-weight business. We pioneered the use of alloy steels, then stainless steels—followed by high strength steels. Now come Republic Titanium and Titanium Alloys. Years of experience gained in helping hundreds of manufacturers design and re-design their products to get more strength with less weight are available to you.

600° F TEMPERATURE HAS LITTLE EFFECT ON DE-ICER DUCTS made of Republic▶ ENDURO Stainless Steel. Because of its extremely high strength-to-weight ratio, and corrosion-resistance you can use ENDURO in thinner, lighter sections. It resists temperature extremes, holding its strength, toughness, and shock-resistance all the way from blistering heat through sub-zero cold. Republic produces ENDURO® in all commercial forms.



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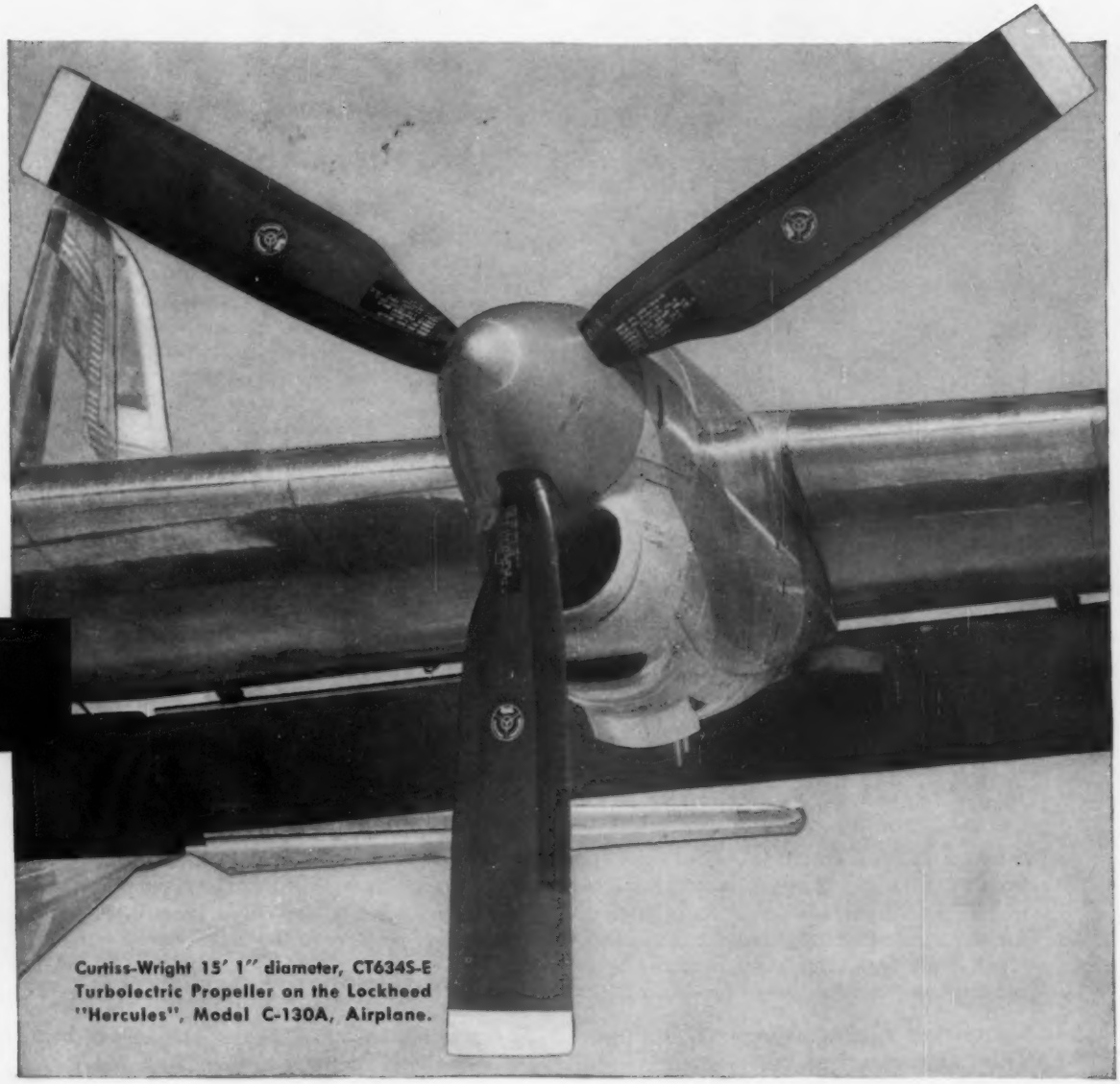

Curtiss-Wright 15' 1" diameter, CT634S-E Turboelectric Propeller on the Lockheed "Hercules", Model C-130A, Airplane.

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Why Allis-Chalmers Cooling Coil Design Means...

Better Rectifier Operation

More Efficient Heat Transfer results from internal cooling coil. The steel coil surrounds active parts, offering more cooling surface and better heat transfer than other types. Unit maintains more uniform temperature and mercury vapor pressure.

Simplified Maintenance results from Allis-Chalmers unique unit construction. All active components are attached to the anode plate for easy withdrawal, dismantling, and re-assembling — as illustrated above.

Positive Arc Barrier is formed by the cooling coil, which is insulated from the tank. The main arc is confined within the coil, preventing arc transfer to the tank.

Years of Operation in hundreds of installations have proved the reliability, ease of operation, and simplified maintenance of Allis-Chalmers mercury arc rectifiers. You can get complete information at your nearby A-C office, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

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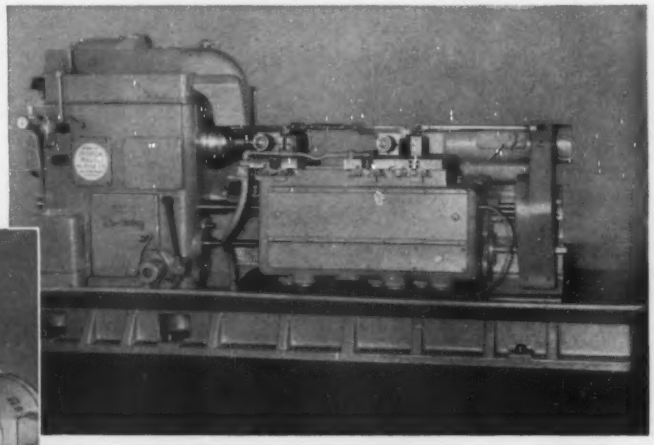
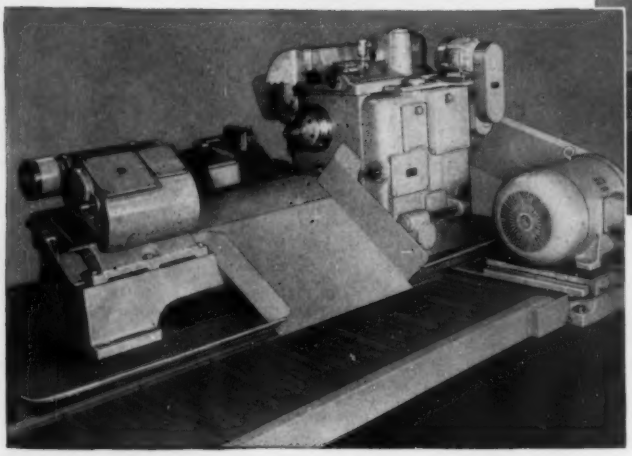
MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

NEW SENECA FALLS DESIGN SOLVES CHIP DISPOSAL PROBLEM





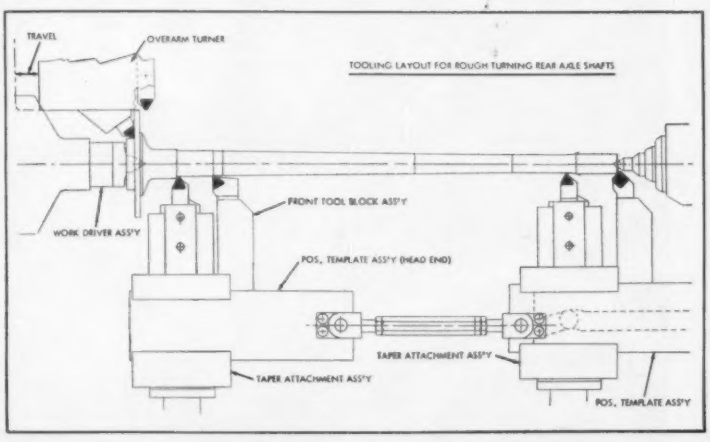
PROBLEM: To eliminate machine down time due to chip accumulation in the tooling area and pan of lathes required for a high production rear axle shaft job.

SOLUTION: To promote rapid flow of chips from the edges of the cutting tools, Seneca Falls engineers designed a special "Chip Flow" type bed for the otherwise standard Model AR Automatic Lo-swing Lathe.

The rear view illustration shows that the usual back shelf has been eliminated in the chip area and replaced with a smooth, steep angle slope which assures an uninterrupted flow of chips from the edges of the cutting tools into the mechanized chip conveyor at the base of the machine. Auxiliary attachments are mounted overhead instead of on the usual back shelf. An auxiliary, cam-operated turning slide mounted on the headstock is used for turning the outside and pilot diameters of the shafts. Facing slides can be supplied to replace this attachment.

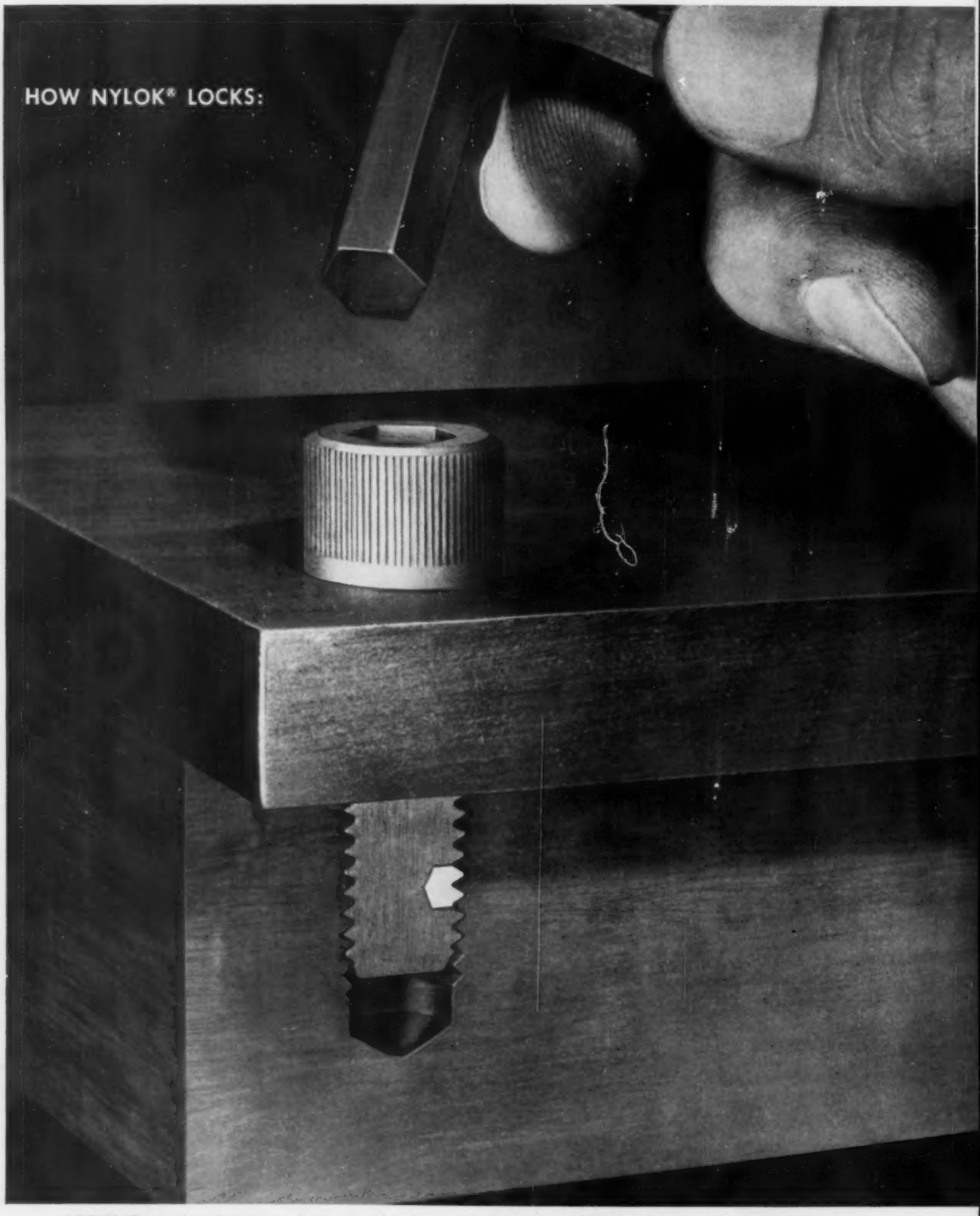
High spindle speeds and coarse turning feeds assure a production of 153 shafts per hour with Automatic Work Handling Equipment.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.



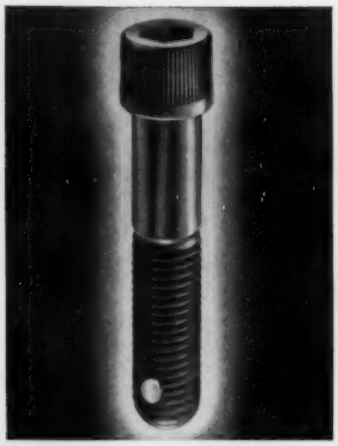
PROFIT ENGINEERED BY SENECA FALLS

NEW—self-locking UNBRAKO

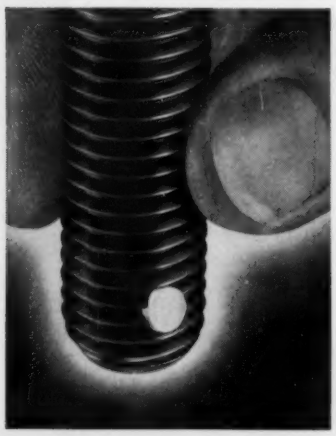


LOCKED! The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together and locks the screw securely.

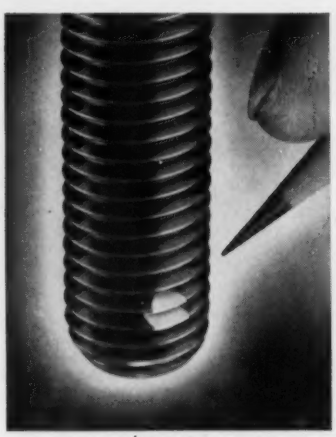
socket head cap screws



Self-locking UNBRAKO socket head cap screw.



BEFORE ASSEMBLY. The nylon pellet projects slightly. When assembled, threads will be impressed into it.



AFTER REMOVAL. "Plastic memory" of pellet has expanded impressed threads to greater diameter than screw threads. Screw can be used repeatedly. In use, "memory" keeps threads tightly locked.

They won't work loose. And they simplify design and save production time.

UNBRAKO socket head cap screws are now available embodying the Nylok* self-locking principle. Nylok provides the first truly practical solution to the problem of making cap screws self-locking.

An UNBRAKO cap screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not work loose.

You save production time when you make products with self-locking UNBRAKOs. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. And in many cases you will save weight and mass by using shorter screws in tapped holes instead of drilling through and using nuts and lockwashers.

Self-locking UNBRAKOs are reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from —70° to 250°F. And, when screws are properly seated, the locking pellet also functions as a liquid seal.

A complete line of self-locking UNBRAKO socket screw products, in a wide range of standard sizes, materials and finishes, is available through your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

**T.M. Reg. U.S. Pat. Off., The Nylok Corporation*

UNBRAKO SOCKET SCREW DIVISION

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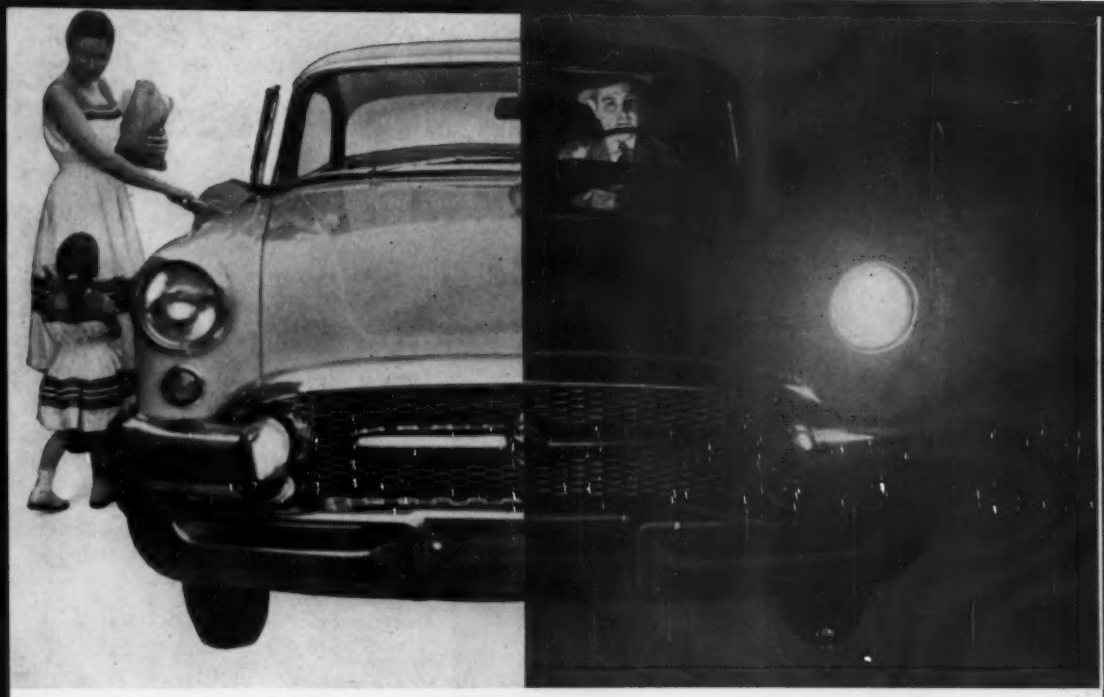

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Therefore, the making of refractory products is the most basically necessary industry there is. Refractories, you see, create industry . . . without them, there would be no industry.

Providing industry with Castables, Plastics, Ramming Mixes, Fire Brick, Mortars, Insulating Brick and Insulation, General Refractories Company draws resources from all over the globe—and operates the world's largest, most-modern refractories research laboratory.

A Complete Refractories Service
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A COMPLETE REFRACTORIES SERVICE FOR THE STEEL INDUSTRY

OLIVE HILL BF and OLIVE HILL HI-FIRED brick rank high in any list of prominent and widely used brands of blast furnace refractories. Manufactured from dense-burning Kentucky flint fire clays by Grefco's unique manufacturing processes, OLIVE HILL brick set a standard for blast furnace refractory quality and workmanship.

Grefco processing of OLIVE HILL brick entails:

1. Careful selection, testing, stockpiling and blending of fire clays to insure uniform raw material quality.
2. Grinding and screening to prescribed formula to promote high density of product.
3. Efficient dearing during brick forming, also to promote density and proper physical structure.
4. Careful firing to exacting temperature schedules to yield uniform high quality brick.
5. Close inspection of final product with gauging and sorting of brick to close size tolerance.
6. Quality control by statistical analysis procedures for the manufacturing processes.

In service, OLIVE HILL blast furnace brick, both BF and HI-FIRED, have produced many splendid performance records in the past. OLIVE HILL linings in presently operating furnaces, are giving outstanding performance and are more than meeting the increasing requirements of the expanding American Iron and Steel Industry.

GF Gets "Dead Flatness" from Pittsburgh Sheet

Production of the Draft-a-Matic, one of GF's newest products, starts the same way as the dozens of other desk-type pieces of office equipment GF makes. Here a stretcher-leveled sheet of Pittsburgh Steel is being trimmed to exact size, the first of many trips it will make through a forming press.

Top Office Furniture Maker Demands Flaw-Free Steel

Forty-one cents from every sales dollar of The General Fireproofing Company—one of the oldest and largest manufacturers of metal office furniture—goes for purchase of materials. And steel makes up a major portion of this expense.

That means sheet steel like that supplied by Pittsburgh Steel Company is the most important single material GF uses. With such a heavy portion of its purchasing involved, GF can't afford to buy less than the best steel available.

In less than 50 years in the metal furniture business, GF has pioneered several steel office equipment products. It produced the first stock steel desk and is now the world's largest manufacturer in this line. It offered the first stock steel filing cabinet, was the first firm to successfully laminate a plastic top directly to steel.

In its big Youngstown, Ohio, plant GF can turn out more than 100 different models of chairs. As one of the top producers in the office equipment field, GF owes its position to the stress it gives three points:

- **The highest quality of materials.**
- **Intensive product development and research.**
- **Vigorous salesmanship backed up by a production skill arising from craftsmanship and ingenuity.**

Ever since it began producing sheet steel, Pittsburgh Steel Company has been supplying an important part of GF's cold-rolled sheet requirements. GF buys Pittsburgh's commercial quality sheets in regular finish ranging from .030 to .093 inch in thickness and from 2 1/16 to 52 inches in width.

Because of its long experience in metal furniture fabrication and the volume of its business now—in excess of 50 million dollars a year—GF has developed rigid, exacting standards for the steel it uses. GF flatness and surface finish standards are very rigid.

The two most critical standards Pittsburgh Steel meets are GF requirements for flatness and good surface finish.

To insure required "dead" flatness in the sheets it uses, GF goes a step

further than most of its competitors by both rolling and stretcher-leveling sheets before they are fabricated into the tops, sides, backs, drawers and doors of office furniture.

Steel sheet is run cold through a roller and is then elongated or stretched on a hydraulic stretcher, sometimes as much as one to three inches. Reduction in thickness is minor.

• **High Standards.** Ingrained dirt, pits, scratches, slivers, cross-breaks, deep rust or other defects—which might have appeared insignificant before stretching—often show up in the elongated sheet should inherent quality not be the best.

These defects, along with water stains, edge corrugation or even the slightest waviness, make the steel unacceptable to GF. When painted, pits and waves in the steel are highlighted. If the sheet is to be laminated with a synthetic covering, as in desk tops, it must present the flattest and smoothest surface possible to produce a good bond.

Some sheet steel can't take stretcher leveling and there have been instances, according to GF Director of Purchases Roy Mills, where GF had to eliminate the supplier entirely.

GF calls the finished Draft-a-Matic the most important advance in drafting room equipment in the past 50 years. Drafting space, calculating, storage and reference areas are incorporated in the same desk.

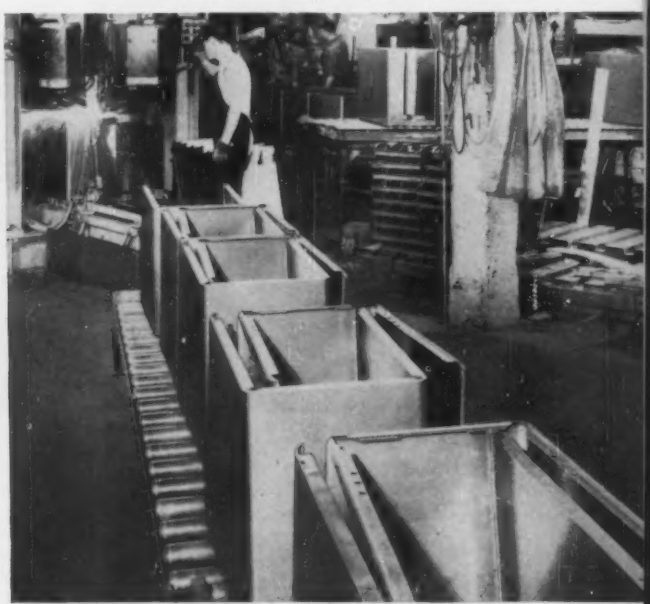
"That has never applied to Pittsburgh Steel's sheets," adds Mr. Mills. "We're entirely satisfied with Pittsburgh Steel from all standpoints of quality."

If Pittsburgh Steel's sheets can meet standards as high as General Fireproofing's, Pittsburgh Steel is a likely solution to your needs for a steel that has:

- *Top Notch Internal Quality* arising from its accurate chemical analysis and proper grain structure.
- *Superior Surface* which is clean, bright and reflective.
- *Flatness and Dimensional Uniformity.*
- *Shapeliness* imparted by inherent strength and formability.

There is an experienced Pittsburgh Steel sales engineer as close as your telephone. He's anxious to apply Pittsburgh Steel's 50 years of know-how and its completely modern sheet production facilities to solve your sheet problems.

A Draft-a-Matic channel results from this operation. Cut-length cold-rolled sheets from Pittsburgh Steel are free from surface scale, thus preventing die damage or imperfect cuts.



After the pedestal has been formed on a tangent bender, the Draft-a-Matic pedestal goes into this automatic welder. Twenty-four welds are made simultaneously.

Pittsburgh Steel Company

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District Sales Offices • Atlanta • Chicago • Cleveland • Columbus • Dallas • Dayton • Detroit • Houston • Los Angeles • New York • Philadelphia • Pittsburgh • Tulsa • Warren, Ohio

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New Cincinnati Rigid Shapers

New Look

THE CINCINNATI SHAPER CO.

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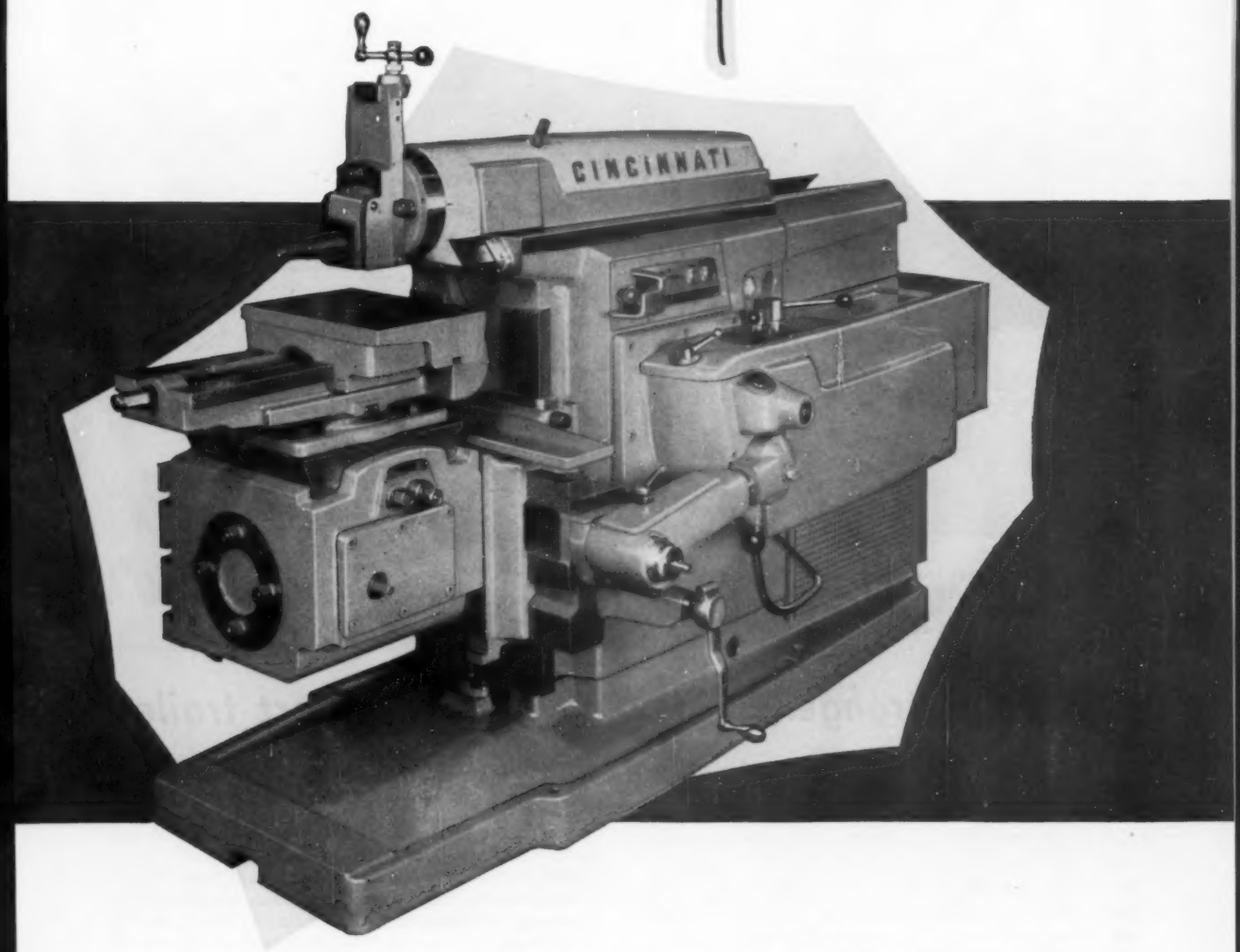
Accuracy . . .



Very rigid and powerful—the New Cincinnati Rigid Shapers give a new accuracy—on heavy cuts and light cuts. They have the most rigid column and ram in shaper history. The Electro-magnetic clutch and brake and 50 PSI positive lubrication are exclusive features that give continued, efficient and accurate performance.

Write for bulletin on these new Cincinnati Rigid Shapers.

Yoloy "E" is on the job

Fruehauf industrial trailers utilizing Yoloy "E" in their construction are: (above) three-compartment, 6300-gallon gasoline transport, and (right) 5000-gallon, 2-inch insulated hot asphalt hauler.

providing stronger, higher payload transport trailers

Keeping our millions of autos on the road—requires the most efficient and economical gasoline transports and asphalt haulers that today's industrial trailer industry can produce. Youngstown's Yoloy "E" Steel plays a prominent part in this picture.

In the two Fruehauf trailers (shown above) for transporting gasoline and asphalt, Yoloy "E" high strength low alloy steel is used to insure structural strength, decrease dead weight and increase payload capacity. Trailer components such as side sheets, top ribs, baffles, bulkheads, stiffeners, inner tanks and outer shells are all fabricated from Yoloy "E". The corrosion resistance of Yoloy "E" gives Fruehauf equipment a much longer service life—which helps build customer profits and satisfaction.

Yoloy is available in sheets, plates, strip, bars, shapes, cold-drawn bars and tubular products—including both seamless and continuous weld pipe. Your nearest Youngstown District Sales Office is ready to supply information and service engineering on the Yoloy Steels best fitted to meet your industrial requirements.

Youngstown
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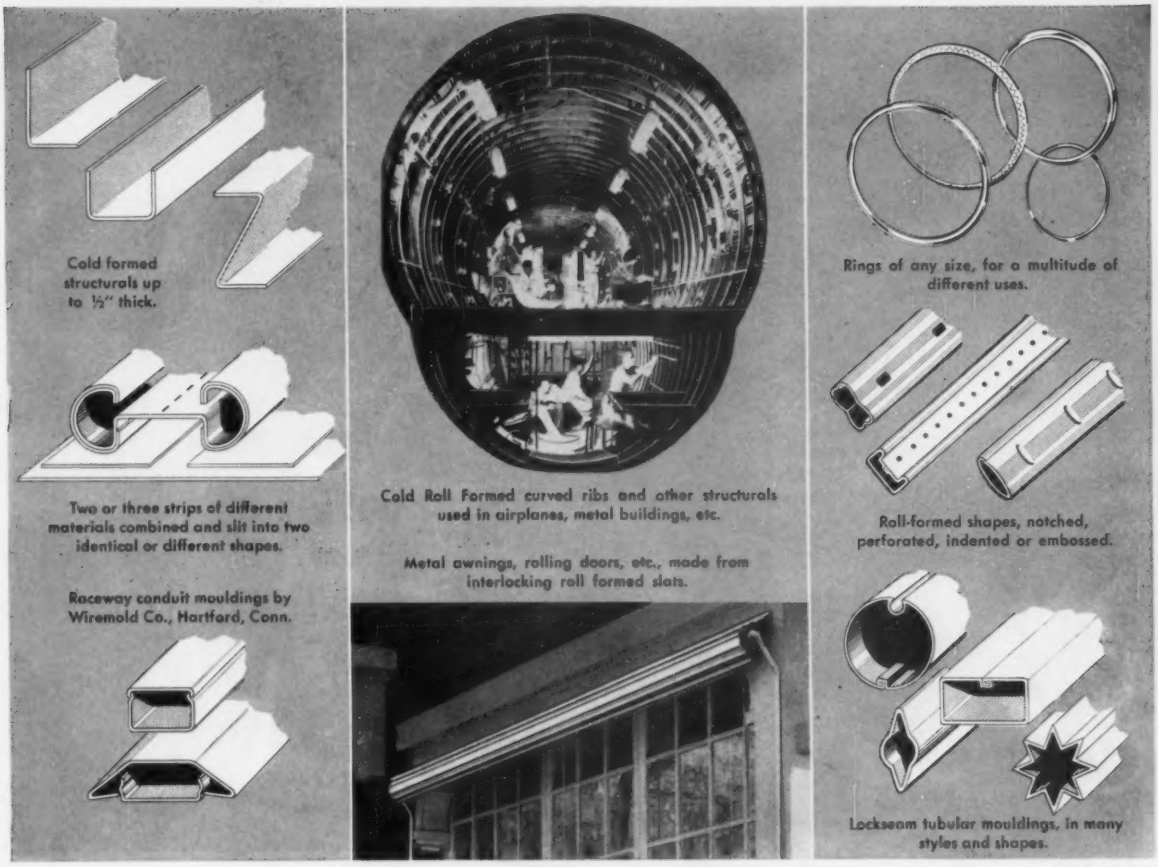
General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS


Cold formed structurals up to ½" thick.
Two or three strips of different materials combined and slit into two identical or different shapes.
Raceway conduit mouldings by Wiremold Co., Hartford, Conn.
Cold Roll Formed curved ribs and other structurals used in airplanes, metal buildings, etc.
Metal awnings, rolling doors, etc., made from interlocking roll formed slats.
Rings of any size, for a multitude of different uses.
Roll-formed shapes, notched, perforated, indented or embossed.
Lockseam tubular mouldings, in many styles and shapes.

1001 Things Now Being Done By COLD ROLL FORMING

• The basic function of a Yoder cold roll forming machine is, of course, to convert flat rolled strip or sheets at high speed into mouldings, panels, tubular, channel and other shapes.

Quite often, these shapes need further elaboration before being ready for assembly or installation. They may, for instance, have to be curved, coiled or made into rings. Or they may need to be perforated at certain intervals of spacing, notched, embossed, or otherwise finished by additional operations. You may want to combine two or more materials into a finished shape, such as carbon steel with stainless, felt, wood, etc.

These and many other things can be done with Yoder machines at little or no extra cost over and above normal conversion costs, simply by providing special attachments, or by auxiliary units installed in line with the forming mill.

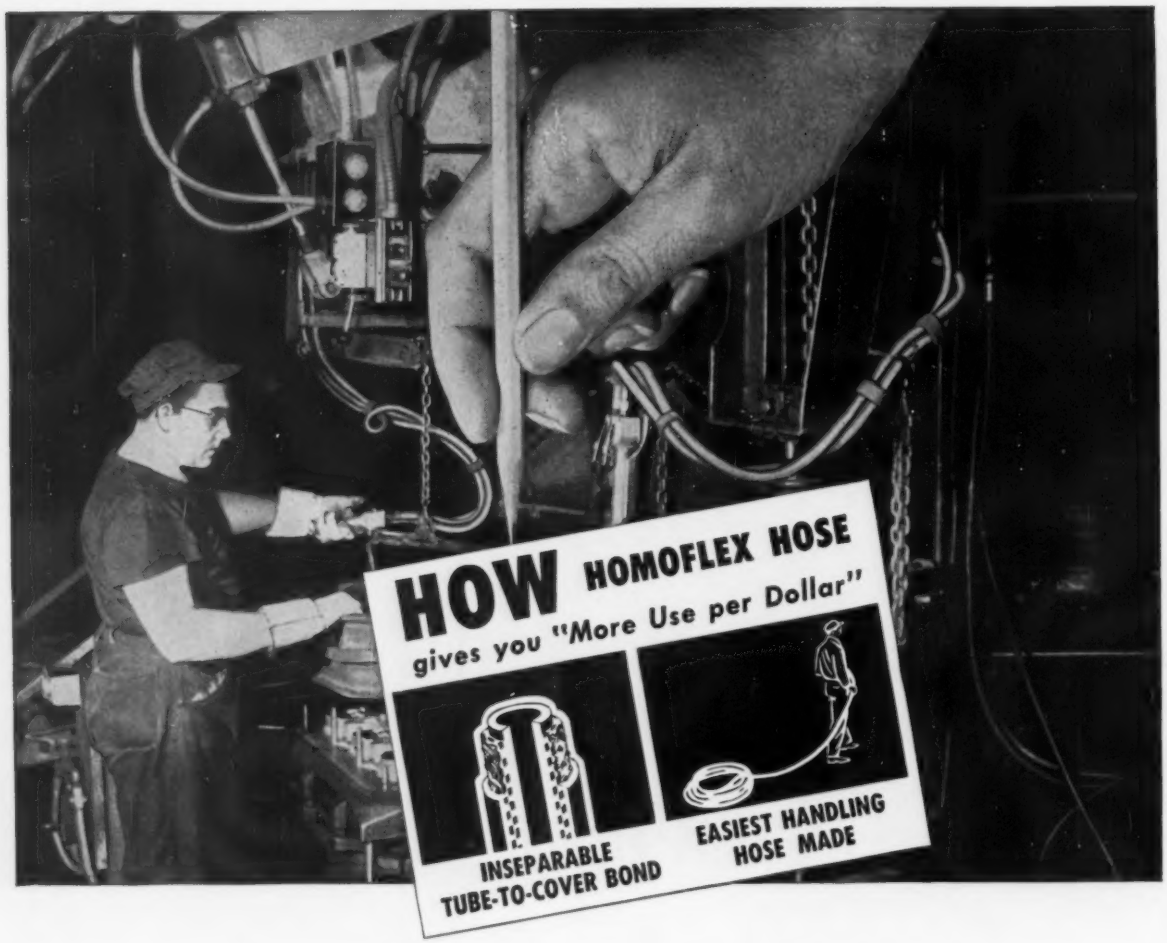
So, to the recognized high economy of the cold forming operation itself, other important production economies may be added. Yoder engineers are at your service in designing equipment of this kind.

The Yoder Book on Cold Roll Forming is a complete text, profusely illustrated, on the art and its scope, the machines, their tooling and application to a multiplicity of mass production needs. A copy is yours for the asking.

THE YODER COMPANY • 5510 Walworth Ave., Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING

COLD ROLL FORMING MACHINES
ROTARY SLITTING LINES
PIPE AND TUBE MILLS—Electric Weld



This Rugged Hose Handles Like a Rope!

Strong enough to stand up under the toughest job conditions, Homoflex Hose is light in weight and as flexible as a rope. It's the easiest handling hose made for use with air, water, and other fluids and gases! The exclusive Homoflex construction increases hose life, too . . . assuring you "More Use per Dollar" for every length you buy.

Homoflex Hose has no pre-set twist. It is mandrel-made to coil and uncoil freely in any direction without kinking. This eliminates the strain that could otherwise lead to costly internal damage and hose rupture. An exclusive process creates a homogeneous, inseparable tube, strength member and cover bond that combines maximum flexibility with rugged strength and durability. Homoflex Hose reduces hose costs because its easier handling features enable workers to get more work done . . . and because it lasts longer. Couplings are easier to fit, too, because Homoflex Hose maintains uniform inside diameters.

Ask your R/M representative about easy handling Homoflex Hose for your operations. He'll also tell you how other types of R/M Hose for general and special purposes do a better job, longer . . . give you "More Use per Dollar".

RM 647

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings • Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

ONE OF A SERIES . . .

What makes a cylindrical roller bearing good?

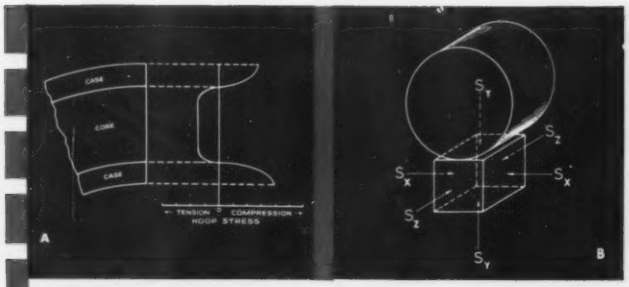
SUPERIOR QUALITY of INNER RACES

The function of an inner race is to provide a fatigue-resistant surface between a shaft and the bearing rollers. Because of roller bearing geometry, there is a smaller area of contact between inner race and rollers than between outer race and rollers. This concentrates more load on the inner race and makes it the critical member from a fatigue life standpoint, particularly when the inner race is the stationary member and maximum load is repeatedly applied at one point.

Since it is vital to good performance that the inner race does not work loose on the shaft, HYATT inner races are designed for relatively heavy press fits, so the inner race becomes an integral part of the shaft for all practical purposes. Other advantages of HYATT'S carburizing process and precision finishing operations are briefly explained at right.

You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your design requirements. Remember, HYATT is America's *first* and *foremost* maker of roller bearings.
Hyatt Bearings Division of General Motors Corporation, Harrison, New Jersey.

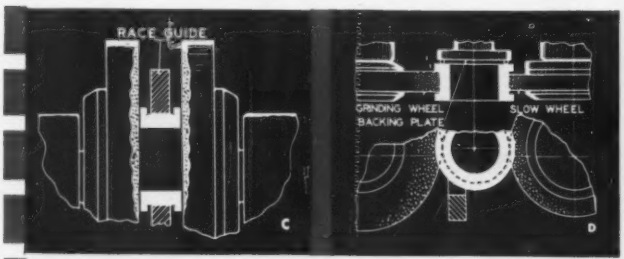
GM GENERAL MOTORS
HYATT
ROLLER BEARINGS



1. WHY CARBURIZING?

Carburizing provides inner races with tough cores, and flanges that will not crack, with no loss of case hardness. This permits tight press fits and also improves load-carrying capacity as shown in Diagram A. During quenching, a volumetric change tends to stretch the core and compress the case. Due to the Poisson effect, the compressive hoop stresses in the external fibres build up the load-carrying capacity.

Diagram B shows a typical element under roller load. Stresses in the "Z" direction are negligible; those in the "X" direction are compressive hoop stresses or pre-load. Those in the "Y" direction are compressive stresses due to the load. Without the compressive stress Sx (hoop stress) the load capacity would be reduced; and if "X" were a tensile stress due to pressing a through-hardened race on a shaft, the bearing capacity would be still less.

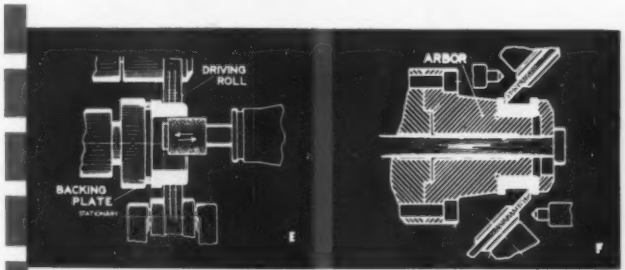


2. DOUBLE END GRIND

In grinding a HYATT inner race, the ends are first faced off square and parallel so they can be used as accurate reference during subsequent operations. The HYATT double end grind process (Diagram C) insures excellent control of parallelism.

3. CENTERLESS PATHWAY GRIND

Centerless grinding was pioneered by HYATT years ago, and eliminates excessive wall variation due to spindle and chucking errors. This method produces as nearly a perfect cylinder as is commercially practical. Two-point and three-point out of round and taper are held to a minimum. Note how work is rotated with backing plate against previously ground end (Diagram D) to insure accuracy.



4. CHUCKLESS BORE GRIND

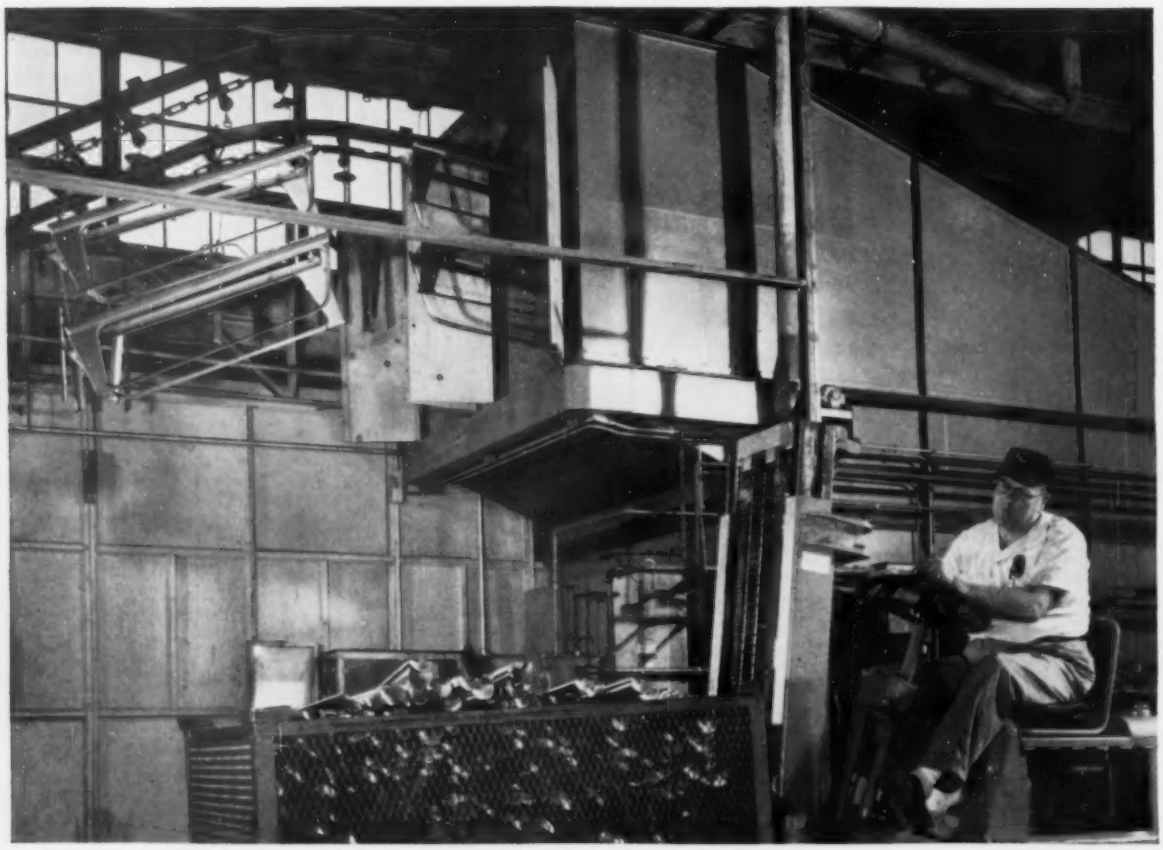
Here the centerless method assures a bore concentric with the pathway, with minimum wall variation, by removing stock from high spots as they pass between drive roll and related grinding wheel (Diagram E).

5. FLANGE GRINDING

To assure that they will run true with roller pathway, flange faces are also ground using the squared ends for reference (Diagram F). This establishes even contact with roller ends during bearing operation.

DOW... *industry's most complete line of chlorinated solvents*

DOW



DOW TRICHLOROETHYLENE

for fast, efficient vapor degreasing

DOW TRICHLOROETHYLENE gives superior degreasing performance. It removes oils, waxes, greases, tars, resins, lubricants and other contaminants. Its high penetrating power and stability assure fast, thorough cleaning action, and smooth low-cost operation. Special inhibitors in DOW TRICHLOROETHYLENE resist deteriorating influences present during degreasing . . . and the solvent remains stable and effective through repeated degreasing and distillation runs.

DOW TRICHLOROETHYLENE is the versatile "workhorse" in the vapor-degreasing field . . . and in most operations, it saves time and money. If your degreasing operation needs improving, you should check on its advantages. Dow technical service is available, upon request, to assist you.

Your local Dow distributor, backed up by the Dow network of producing plants and shipping terminals, can give you fast, dependable delivery on DOW TRICHLOROETHYLENE. Dow distributors also handle these other superior chlorinated solvents: DOW PERCHLOROETHYLENE (Industrial), METHYLENE CHLORIDE, and the effective cold cleaner, CHLOROTHENE®. For complete information on any or all of these solvents, write THE DOW CHEMICAL COMPANY, Dept. S 957A, Midland, Michigan.

you can depend on DOW SOLVENTS DOW

AXELSON production and maintenance news

AXELSON MANUFACTURING COMPANY / DIVISION OF U. S. INDUSTRIES, INC. / 6160 SOUTH BOYLE AVENUE, LOS ANGELES 58, CALIFORNIA

New 32″ heavy-duty lathe has 75-hp headstock... handles peak loads to 100 hp.

Axelson's new 32″ heavy-duty lathe is a rugged tool that can be used with equal effectiveness on rough or precision cuts. It has 24 spindle speeds in true geometric progression from 6 to 750 r.p.m.

The main bed casting is designed for maximum stability and for resistance to the twisting forces of heavy-duty turning. The carriage bed ways are hardened and ground alloy steel.

Two levers control the selection of feed changes on the new Axelson totally enclosed gear box. There are 81 feeds, ranging from .005″ to .351″ per revolution of the spindle; 45 threads may be cut, ranging from 1 to 30 threads per inch. This range of feeds and leads is sufficient for the large majority of all machining operations.

The extra-heavy, box-type apron is completely enclosed, which permits all shafts and gears to run in a continuous oil bath. All carriage controls are located on the apron convenient to the operator. Clutch levers operate cross and longitudinal feed controls.

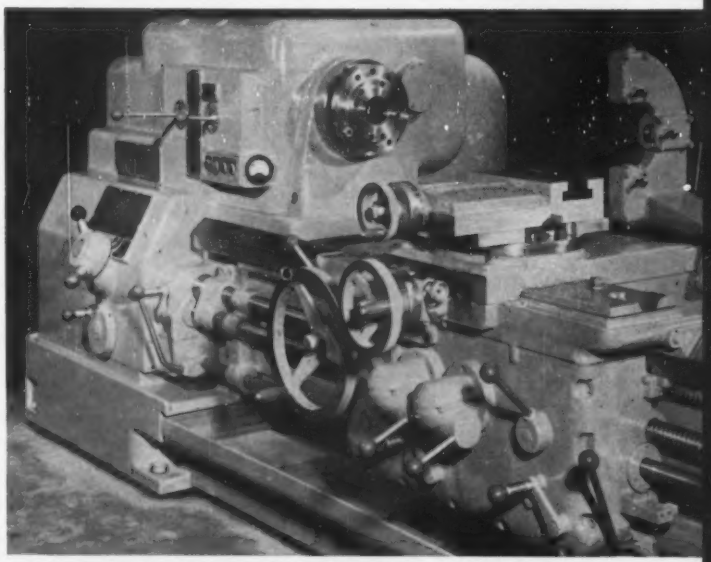
The tailstock is a rugged one-piece casting. The two-speed feature provides rapid movement of the tailstock center up to the work piece, and slow powerful movement of the spindle for feeding drills, reamers, or other tools held in center. The tailstock can be easily moved manually in either direction by a hand crank at the front of the machine.

A micrometer cross-feed positive stop, which permits the operator to set the cross-slide travel to stop at a predetermined point, is positive, will not slip, and will permit accurate dimensions to be duplicated repeatedly.

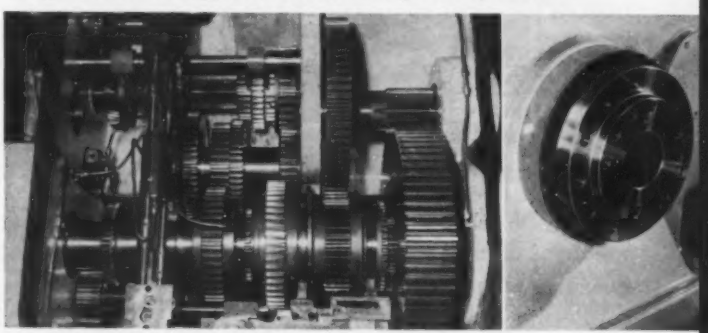
Standard equipment is the power rapid traverse for quickly moving the carriage in either direction. This feature saves valuable production time and reduces operator fatigue to a minimum. A lever mounted at the left-hand side of the carriage controls the carriage movement.

For a complete description and detailed specifications on Axelson Tool Room, Medium-Duty and the new 25/16 and 32″ Heavy-Duty Lathes: Write for bulletins 19-5507 and 5504.

AXELSON **Manufacturing Company**
Division of U. S. Industries, Inc.



NEW 32″ HEAVY-DUTY LATHE. Designed for flexible, effective operations, this machine combines rugged construction and precise operation.



HEADSTOCK. Twenty-four spindle speeds divided into a true geometric progression from 6 to 750 r.p.m. are ideally suited for a wide variety of work, permitting high speed turning and large diameter work in new metals and alloys.

SPEED SELECTION. Two levers make speed selection simple and fast. Position of the levers tells operator the speed at which spindle is running or the speed change desired. Automatic electric brake stops spindle instantly.

HARDEST MAN-MADE METAL

TALIDE METAL, a tungsten carbide of superior quality, is harder, stronger, and more resistant to abrasion than any other metal. Properly applied, it gives superior service on applications where wear, heat, strain and shock are destructive to other metals.

- **ABRASION RESISTANCE**— Up to 100 times that of steel.
- **COMPRESSIVE STRENGTH**— Higher than all melted, cast or forged metals and alloys.
- **RESISTANCE TO DEFORMATION**— 2 to 3 times greater than steel.
- **HEAT RESISTANCE**— Resists oxidation and thermal shock up to 1500° F.
- **THERMAL EXPANSION**— Less than half the rate of steel, "creep" is negligible.
- **FRICTIONAL RESISTANCE**— Lower than steel, non-galling, "slippery" properties higher.

TALIDE METAL is saving industry millions of dollars annually by wear-proofing vital parts on machine tools, presses, pumps, compressors and other types of processing equipment used in the steel, oil, chemical, plastic, auto, rubber, textile, glass, mining and metal-working industry. The physical properties of the most commonly used grades are listed below. Other grades are available for specialized applications.

PHYSICAL PROPERTIES OF TALIDE METAL (P. S. I.)

Application	Operation	Talide Grade	Rockwell "A" Hardness	Specific Gravity (Density)	Transverse Rupture Strength	Compressive Strength	Co-Efficient of Thermal Expansion	Modulus of Elasticity (Deflection)
WEAR SURFACE	No Shock	C-91	91.6	14.90	235,000	710,000	3.00x10-6	91,000,000
	Light Shock	C-99	91.0	14.75	265,000	670,000	3.65x10-6	84,000,000
	Medium Shock	C-88	89.5	14.55	295,000	635,000	4.00x10-6	80,000,000
IMPACT	Light	C-85	88.4	14.25	315,000	600,000	3.75x10-6	77,000,000
	Medium	C-80	87.0	13.85	335,000	550,000	4.50x10-6	74,000,000
	Heavy	C-75	85.0	13.15	355,000	500,000	5.00x10-6	70,000,000

Note: Hardness values may vary plus or minus .2 to .3 on individual lots.

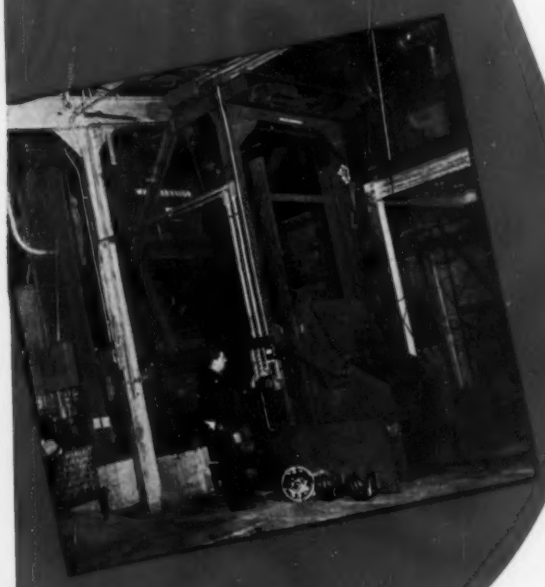
All TALIDE METAL grades are made in latest type vacuum electric furnaces by precision methods under rigid control. A wide variety of shapes and sizes can be supplied—up to 25" in diameter, 100" in length, and 5000 pounds by weight. Parts can be supplied to any grit finish required down to one micro-inch.

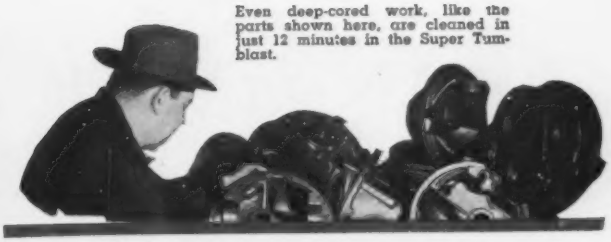
Metal Carbides Corporation,
Youngstown 12, Ohio.

Send for new 76-page catalog 56-G or ask for sales engineer to call.

UP TO 100" IN LENGTH EXCLUSIVE WITH METAL CARBIDES
METAL CARBIDES CORPORATION
TALIDE®
YOUNGSTOWN 12, OHIO
HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

IN BATCH TYPE CLEANING THE BIGGEST SAVINGS ARE MADE WITH THE WHEELABRATOR SUPER TUMBLAST





Even deep-cored work, like the parts shown here, are cleaned in just 12 minutes in the Super Tumblast.

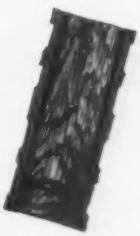
at Dayton Malleable Iron Co.

the WHEELABRATOR SUPER TUMBLAST

Cleaned 2827 tons of the toughest work as fast or faster than a 2-wheel machine and used *only* *one set of blades*

Saved 66.2% in Blade Costs
(Other Maintenance Costs Proportionately Low)

Saved 30% in Abrasive Consumption



The original blades lasted 696 hours, cleaned 2,827 tons of castings, at a cost of only 2.2c per wheel hour.

The tremendous savings promised for the Wheelabrator SUPER TUMBLAST are being delivered in actual performance. At the Ironton Division of Dayton Malleable Iron Company, for example, maintenance savings have been outstanding . . . the maintenance foreman says: "this machine is designed for the maintenance man."

The new Super-efficient Abrasive Separator is perhaps the greatest single cost-saving feature of the Super Tumblast because it affects so many areas. Having 3 times the air separation area of the conventional separator, it provides more effective and uniform removal of all abrading contaminants from the abrasive system without removing usable abrasives. It assures that super-clean abrasive is fed to the wheel at all times.

The Wheel itself is a new development of tremendous importance to cleaning economy because it throws more than twice as much abrasive as any similar sized wheel previously used. The wheel has new blades for longer wear, a strain-free blade holding device, a new easy-service guard housing, a new system of wheel guard liners . . . all designed to minimize maintenance.

Among the many other cost-reducing features designed into the Super Tumblast are the Super-Tight Cleaning Chamber that prevents jamming of the work, the Super-Sealed Door which prevents abrasive loss, and the use of Wheelabrator Long-Lyfe Parts at all high-wear points.

The Wheelabrator Super Tumblast will save YOU money . . . let us show you how. In the meantime, write for illustrated Brochure No. 125-D.

WHEELABRATOR
CORPORATION
510 S. BYRKIT STREET MISHAWAKA, INDIANA

Chicago to New York—15c a casting! Ship UNITED!

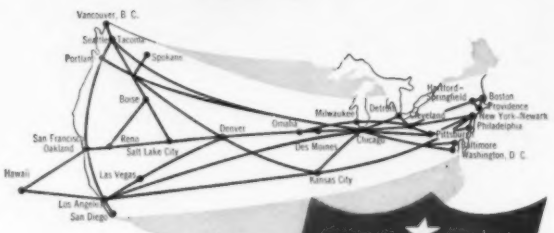
TWO-POUND MACHINED CASTINGS leaving Chicago aboard United's 300-mph DC-6A "Big Lift" Cargoliners arrive in New York in just 3 hours! Cost for 100-lb. shipment—$7.50*.

AND YOU GET THESE UNITED "EXTRAS"—Space dependability made possible by Reserved Air Freight.... On-time dependability, by weather-mapping radar.... Faster, safer handling, by pre-loaded aluminum pallets.... Day and night cargo service, by United's frequent Mainliner and Cargoliner schedules.

Examples of United's low Air Freight rates

	*per 100 pounds**
CHICAGO to CLEVELAND	$4.78
DENVER to OMAHA	$6.42
NEW YORK to CHICAGO	$7.50
SEATTLE to LOS ANGELES	$12.02
PHILADELPHIA to PORTLAND	$24.15
SAN FRANCISCO to BOSTON	$27.00

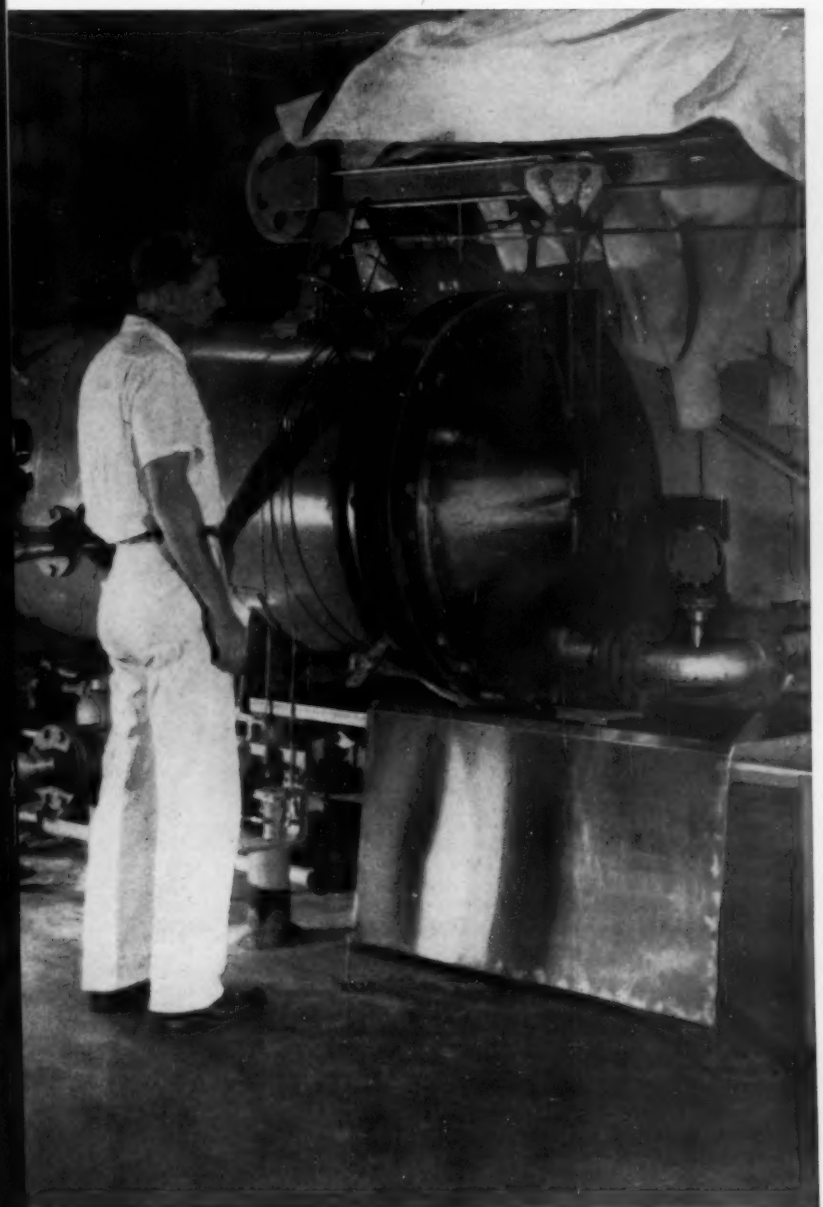
*These are the rates for most commodities. They are often lower for larger shipments. Rates shown are for information only, are subject to change, and do not include the 3% federal tax on domestic shipments.



SHIP FAST...SHIP SURE...SHIP UNITED AIR LINES

For service, information, or free Air Freight booklet, call the nearest United Air Lines Representative or write Cargo Sales Division, United Air Lines, 36 South Wabash Avenue, Chicago 3, Illinois.

NOTHING *can equal Stainless Steel*



FOR CORROSION RESISTANCE. The Norwich, N. Y. plant of Norwich Pharmacal Company is a magnificent display of Stainless Steel. Shown here is a Stainless Steel filter, used to separate mother liquor from the solids of furoxone. Here, Stainless outlasts any other practical metal by two to one.

No other design material can match Stainless Steel in its *combination* of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When buying Stainless, remember that United States Steel offers the widest range of types, finishes and sizes available in the United States.

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

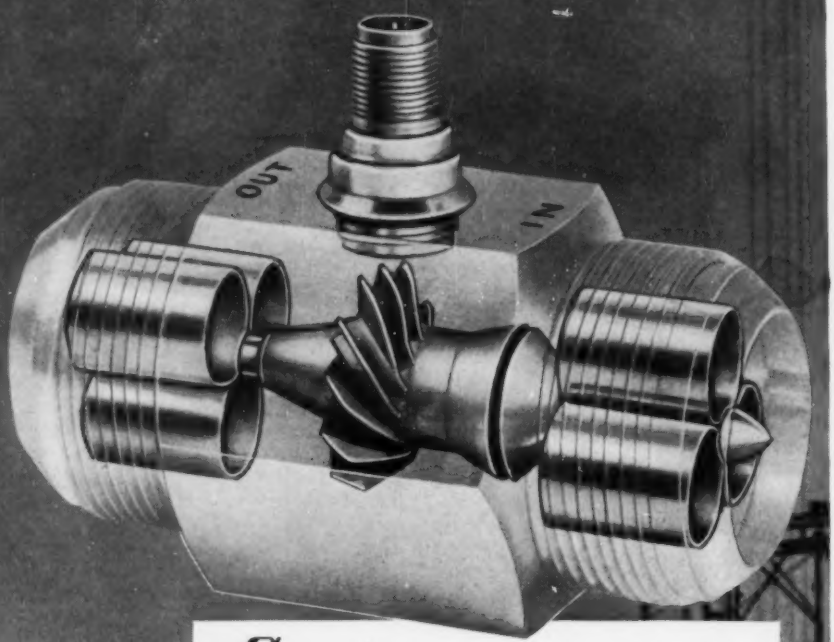
FOR EASY CLEANING. In this textile plant of W. J. Dickey & Sons, Inc., dyeing time *and* costs have been cut 50% with the use of Stainless Steel equipment. When colors are changed, tanks don't have to be boiled out. With its smooth, dense surface, Stainless can be cleaned easily and quickly.

FOR CONSUMER APPEAL. Now, just about every housewife knows what Stainless Steel is. When she sees the Stainless tub in this automatic laundry, made by Speed Queen Corp., Ripon, Wis., she knows that there is nothing to corrode. She knows, too, that the Stainless tub will stay bright and clean and will last forever.

UNITED STATES STEEL

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALABAMA • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Taming corrosive rocket fuels



Carpenter Stainless No. 20 controls flow of liquid oxygen, red fuming nitric acid

Vital parts of these flow sensing units must have extreme corrosion resistance and durability. Machined from Carpenter Stainless No. 20 bar stock, they measure the flow of liquid oxygen and red fuming nitric acid (90-98% concentration). The No. 20 parts have outlasted two Type 316 housings. The units are so rugged that rocket experts recover them from wrecked missiles for re-use.

Similar units also measure the flow of oil to industrial furnaces, gases, slurries and other corrosive fluids at rates of .09 to 3000 gpm. They operate from 1000°F down to temperatures approaching absolute zero, and at pressures up to 35,000 psi.

If you design, build or use equipment that must withstand corrosive attack, discover how Stainless No. 20 and No. 20Cb can save you money. Eight different forms—bars, billets, pipe, plate, sheet, strip, tubing and wire—of these super-corrosion resistant alloys are available from . . .

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

more than corrosion resistance

Stainless No. 20

Carpenter No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

FEEDING FURNACES . . .

Another proven PAYLOADER® job!

The predominance of "PAYLOADER" tractor-shovels at steel mills, foundries and industrial plants of all kinds is silent tribute to their ability to "take it" as well as to "dish out" real production on all kinds of bulk-material handling jobs.

Today's "PAYLOADER" units are the finest in tractor-shovel history — in handling ease and maneuverability, in productive capacity, in reliability and low maintenance. And today's "PAYLOADER" line is also the most complete, most-proven line of tractor-shovels available — from 18 cu. ft. to 2¼ cu. yd. bucket capacity.

there's a proven PAYLOADER® to fit your job!

FRONT-WHEEL DRIVE
Model HA — 18 cu. ft. capacity (illustrated)
Model HAH — 1 cu. yd. capacity

REAR-WHEEL DRIVE
Model HF — 1 cu. yd. capacity
Model HFH — 1⅓ cu. yd. capacity

FOUR-WHEEL DRIVE
Model HU — 1⅓ cu. yd. capacity
Model HH — 1¾ cu. yd. capacity
Model HO — 2¼ cu. yd. capacity

THE FRANK G. HOUGH CO.
733 Sunnyside Ave., Libertyville, Ill.

Send information on "PAYLOADER" units having:
☐ Front-wheel drive ☐ Rear-wheel drive ☐ Four-wheel drive

Name _____
Title _____
Company _____
Street _____
City _____
State _____

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

PLAY IT SAFE..

Choose Allis-Chalmers Fork Trucks

for Both Profit and Protection!

"It is impossible to estimate the value of this fork truck in improved safety and in manpower saved," says owner. The Allis-Chalmers 6,000-lb truck has 360° rotater and torque converter drive, clears scrap from around presses and hauls it 300 ft to scrap area at Carrick Products Co., Detroit.

See us at the

IRON AND STEEL ENGINEERS EXPOSITION

Cleveland, Sept. 25-28

Booths 34-43

and the

NATIONAL METAL EXPOSITION

Cleveland, Oct. 8-12

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Users say that Allis-Chalmers fork lift trucks are the most efficient and economical they ever used — *also the safest.*

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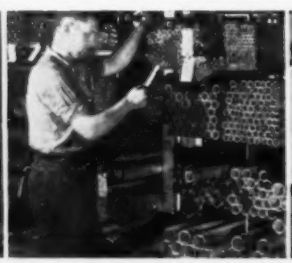

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NEWSFRONT

Nickel Users: Getting Nervous

Nickel users are urging that Office of Defense Mobilization switch its stockpiling strategy. Current plans call for an abrupt cut in nickel stockpiling next year. Users fear this prospect will create a market uncertainty, discourage expansion of nickel-producing facilities. Instead, they want ODM to begin tapering off now in its monthly nickel bites.

Counter-Revolution in Color Options?

At least one automaker thinks that wide customer options on color combinations and trim have reached the point of diminishing returns. Studebaker starts cutting back on color options this year. Explanation: Added costs of wide color variety doesn't pay off in sales. Also, it complicates dealer stocking and display problems.

Standard Products Pare Military Costs

Standard commercial products are now entering the Army Engineers' supply chain in growing quantity. They're saving both money and strategic materials. Examples: Elimination of 17 items of firefighting equipment conserves an estimated 80 tons of copper, and a 68 pct reduction in engineer repair tools is found practicable. Finally, 800 of the 2500 types of handtools stocked a year ago are dropped.

And Now, Flashless Flash-Butt Welding

Redesigned equipment should widen usefulness of the flash-buttwelding process. Costly post-weld operations formerly required to machine, grind or chisel off flash are eliminated by a new machine now commercially available. This both welds, shears resulting flash in a one-two operation.

Motorists Are Chief Smog Offenders

Of more than 50 air contaminants, say Los Angeles air pollution experts, hydrocarbons are among worst smog causers. These stem chiefly from more than 2,500,000 autos on county's roads daily, exhausting 7 pct of their gasoline as unburned vapors. Smog occurs when hot, compressed air layers above county prevent vapors from rising, dissipating normally. By best guess, acceptable corrective (fuel control) devices won't be ready before late '57.

Are Steelmen Too Conservative?

Top steelmen are sticking to their last official estimates of steel expansion. But informed sources feel actual increase in capacity is apt to climb closer to 18 million tons than the 15 million tons predicted over the next three years. The industry's traditionally conservative in estimating its plans; probably is understating in this case again.

New High-Temperature Vacuum Alloy

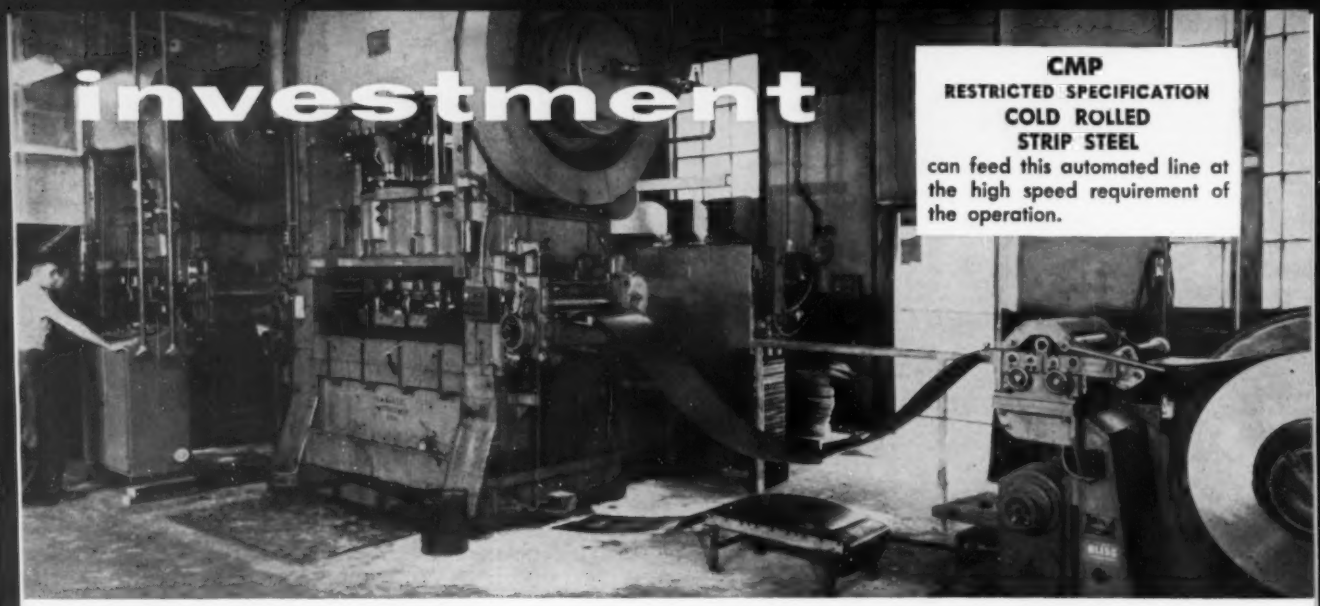
Recent tests on a new high-temperature aluminum- and titanium-bearing alloy make a strong case for vacuum-melting over the air-melted product. The nickel-base material has an average room temperature ultimate strength of 167,000 psi, yield strength of around 100,000 psi in the form of mill-annealed bar stock. Stress-to-rupture for 100 hours at 1500°F was 20 pct higher—38,000 psi for barstock, 37,000 for sheet. Strength, ductility remain high to 1750°F.

Aluminum Deliveries: The Outlook's Good

Four-quarter outlook for delivery of aluminum mill products from integrated producers is relatively good, despite the strike. Here's the way producers stack it up: Basic sheet—from 4 to 6 weeks, depending on the alloy; castings—5 to 8 weeks, depending on size and type; extrusions—4 to 6 weeks; foil—5 to 6 weeks; impact extrusions—anywhere from 4 to 12 weeks, because of variety of sizes and dies used.

New Twist on Drop-Of-Water Test

The aircraft industry, adapting the drop-of-water test for checking cleanliness of jet bomber panels prior to bonding, has worked in a new wrinkle. Now, an optical instrument gages the distilled water droplet for angle of elevation—to within 1°. The higher it stands, the more minute dirt particles there are blocking its outward flow. The improved test is reported fast, simple, inexpensive.



Costly new equipment is not always the sole answer to production cost problems. Often the wrong raw material may completely nullify expected savings from heavy capital investments in modern machinery.

Consider the case of one manufacturer who installed expensive new forming equipment but was unable to up production to the expected level. Material being formed was cold rolled strip 4" x .060", AISI 1050 steel processed to standard gauge tolerances (.0567" to .0632").

When **CMP** Precision Cold Rolled Strip Steel ordered to a 60% gauge restriction (.0587" to .0613") was furnished, production immediately moved up to the rated capacity of the machines and has remained there.

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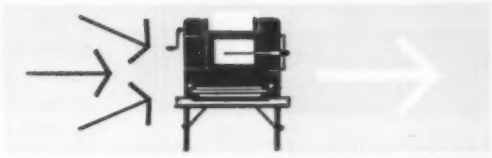


NEWS SECTION

ALUMINUM: Will Market Balance by 1958?

Fabricators fight short supply in midst of biggest expansion program . . . But 1958 should see new sources available . . . Producers oppose strict distribution formulas to fabricators—*F. J. Starin.*

◆ SPOT SHORTAGES of aluminum still occur in the midst of the biggest boom era in the history of the industry.

Even with loss of some production because of strikes, output of primary metal in 1956 will be about 1.7 million tons. As recently as 1950, only 718,000 tons was produced domestically.

But despite this booming production, nonintegrated fabricators of aluminum aren't satisfied. Small mills contend that, although the Big Three producers are increasing production capacity at a phenomenal rate, they are setting an equally fast pace with construction of new fabricating facilities.

Supply Lags

As a result, the amount of aluminum available for fabricators lags behind the total increase in aluminum production.

Report of the Yates Committee, a subcommittee of the House Committee on Small Business, shows that since 1950 total aluminum supply available for nonintegrated processors increased 57 pct.

But at the same time, total supply earmarked by producers for their own fabricating facilities increased a whopping 78 pct.

Reactions to the Committee investigation were mixed. Kaiser, according to the report, "has expressed and demonstrated a policy, at least for the present, of caring for nonintegrated users to an increasing degree."

Reynolds spokesmen declared: "Our plans are to increase our fabricating capacity and our ingot capacity. We are fabricators, we are merchants, and we intend to continue to go on in every way we can."

All three of the producers objected to rigid formulas of distribution.

Not a great deal of relief for fabricators is expected until 1958 when new producers and new capacity should increase substantially the amount of aluminum available for fabricators.

The Picture

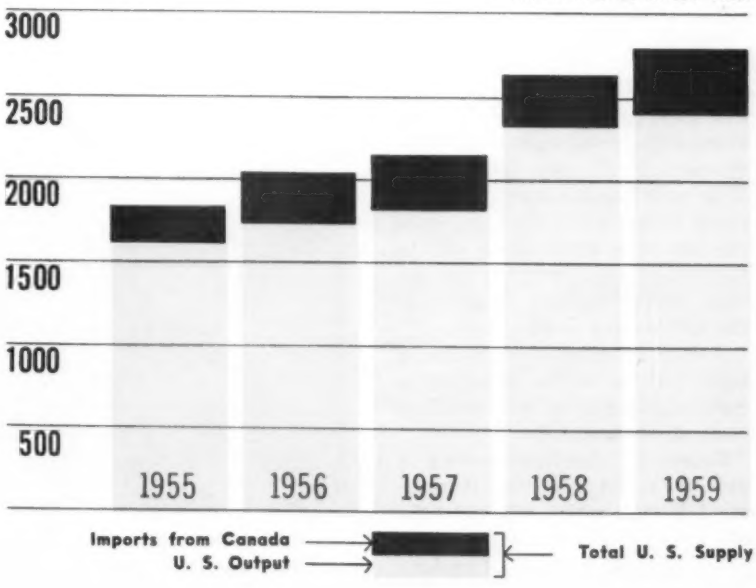
The Yates Committee also discovered that since the removal of government controls following the Korean conflict, many of the small independent processors have been losing ground percentagewise. Their share of their particular segment of the industry, as compared to what they previously had, looks something like this:

	After Controls	Before Controls
Sheet and plate	7 pct	5 pct
Foil	31 pct	32 pct
Wire, covered cable	40 pct	43 pct
ACSR, base cable	23 pct	27 pct
Extrusions	54 pct	40 pct
Powder, flake, paste	20 pct	42 pct

Sheet and plate producers were an exception. But even with the 2 pct gain, they are still an inconsequential part of the industry. Nonintegrated producers of extruded shapes and drawn tubing were the only solid exception, tak-

Aluminum Supply Climbs

Thousands of Short Tons



ing over half of the market.

Look Ahead to 1958

The big year for the nonintegrated processors, as well as the consumers of mill products, will be 1958. This is the year that much of the increased facilities now under construction will be producing at capacity.

A vital factor in making this a banner year is that contracts between Aluminium Ltd., and Kaiser and Aluminum Co. of America, calling for the delivery of substantial quantities of Canadian aluminum ingots to the American companies will expire.

In 1956, 40 pct of Aluminium's Canadian production, about 250,000 tons, will find its way across the border. About 140,000 tons of this total will go to Alcoa and Kaiser. Aluminium's president Nathanael V. Davis has stated that his company must sell ingot to stay in business, and that the emphasis in its U. S. sales pitch is on nonintegrated fabricators. Therefore, it is likely that much of the capacity now going to American producers will be available to nonintegrated processors.

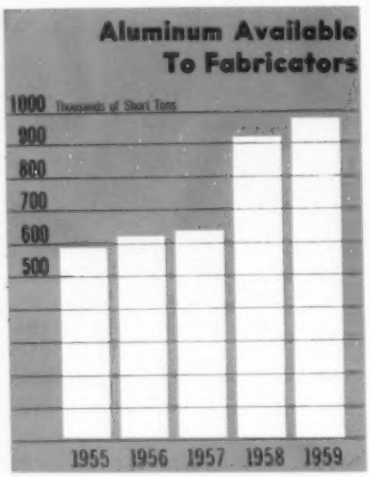
Expansion Plans

Aluminum Co. of America will begin production in its new Evansville, Ind., reduction plant in the fall of 1957. Capacity will be about 150,000 tons. In addition, two new potlines will replace older and slower units at Alcoa's Massena, N. Y., plant late in 1958. This will boost output there by about 10,000 tons. By the end of the key year 1958, Alcoa will be turning out about 952,500 tons per year, within hailing distance of the million ton mark.

Kaiser Aluminum will add a ninth potline to the already-biggest-in-the-industry reduction plant at Chalmette, La.

Kaiser is also constructing a new reduction plant at Ravenswood, W. Va., which will add 125,000 tons of capacity to the company's output. There will be four potlines, with the first going into production by mid 1957 and the last by the end of that year. This means that by 1958 Kaiser will be in a position to produce 587,000 tons of aluminum annnually.

Reynolds Metals has four major expansion projects currently in



construction stages, ranging from an increase of 500 tons of primary metal at Longview, Wash., to 19,000 tons more capacity at Listerhill, Ala. In addition, Reynolds will add another 100,000 tons of capacity to Listerhill, expected to be ready for production by the beginning of 1958. This will mean an output in that year, by Reynolds, of 575,000 tons. This is a tentative estimate since Reynolds is currently seeking a site on which to construct another reduction plant.

Producers number five and six, Harvey Aluminum, and Olin Revere Metals, will be in production by 1958. Harvey will complete its reduction plant at The Dalles, Ore., late in 1957, and by 1958 will be producing at an annual rate of 67,000 tons. A good percentage of this will probably reach nonintegrated processors. The Yates Committee reports that Harvey's output will be subject to General Services Administration contractual requirements, under which two-thirds of production, less priorities required by law and government purchases, must be offered to nonintegrated users.

Indirectly

The Olin Revere Metals Co. entrance into the field will have only an indirect effect on the supply of aluminum ingot and pig. According to initial contracts, Olin Mathieson will take two-thirds of the output and Revere one-third for their own fabrication. However, this will lighten the load by taking both firms off the market as buyers to the extent of the company's production.

Production from Anaconda Aluminum will have little or no effect on the open market for a number of years. Most of the aluminum is earmarked for associated fabricating companies.

All prognostications on the next half decade are dependent on the situation remaining relatively stable during that time.

ON THIS SITE, near Hannibal, O., construction engineers and workmen of F. H. McGraw & Co. are erecting the new Olin Revere aluminum plant.

TUNGSTEN: U.S. Stockpile Program Hit

Philip McKenna of Kennametal, Inc., claims there is no shortage of tungsten . . . Calls government's price incentive policy "short sighted" and unnecessary . . . Lower, more stable prices needed—By G. J. McManus.

◆ TUNGSTEN MAY SOON be the center of a lively hassle. As the government continues to buy up most of the metal in sight, strong statistics are being advanced to show there is no shortage of tungsten, that stockpiling is wasteful and harmful.

Occasion of the outbreak is the new program of tungsten buying. The last Congress okayed the purchase of 20 million lb of tungsten from domestic producers. This will be in addition to tungsten imports, which have been running over 20 million lb a year and which find their way into government nesteggs in generous lumps.

Proponents of stockpiling say tungsten consumption is rising. They say domestic producers would wither without government support and that large quantities of tungsten must be available for defense production.

Production Doubled

On the question of consumption, there has been little change in the peacetime rate over the past ten years. U. S. consumption is running about 8 million lb a year. This compares with shipments (domestic and import) of over 35 million lb a year. It compares with a stockpile level that is estimated at 160 million lb. On the basis of recent experience, we have enough tungsten stockpiled for 20 peacetime years.

A very specific purpose of the new program is to keep U. S. mines operating. The new law says the government will pay no less than $55 per short ton unit of tungsten trioxide. An earlier program set the minimum at $63. These laws have had their designed effect: Shipments from U. S. tungsten mines have more than doubled since 1952.

But one mine owner feels the price incentive policy is shortsighted. Head of Kennametal, Inc., Latrobe, Pa., Philip McKenna makes cutting tools and other tungsten carbide products. He also owns the third largest tungsten mine in Nevada and netted nearly a million dollars from this last year.

Subsidies Unnecessary

And he feels that removal of subsidies would benefit the whole tungsten industry in the long run. He reasons this way: Lower and more stable prices would encourage greater use of tungsten in commercial uses. As it stands, the world market price of tungsten is about $30 a unit (U. S. duty is $8). Without the United States bulling the market abroad and pegging the level at home, prices would drop sharply, says Mr. McKenna.

He says that today companies are wary about putting money into tungsten products when there is always the chance that such a drop will devaluate their inventory. On top of this, the government's stockpiling programs create an uncertain supply situation.

On the question of defense needs, the tungsten picture is blurred. During World War II, peak tungsten consumption was a little under 20 million lb a year. On this basis, the present stockpile would be good for eight years of war.

Fallacies Exist

Some Washington authorities say our defense requirement for tungsten is constantly increasing. They cite jet engines, guided missiles and atomic weapons as developments that will take more and more tungsten. There are no exact figures but a spot check of leading superalloy and carbide producers failed to reveal any developments that would bring a marked increase in tungsten use.

Mr. McKenna says the whole fallacy of the stockpile program is that it fails to take note of developments that have brought more economical use of tungsten. The conventional tool steel before World War II had 18 pct tungsten. Since the war there has been a swing toward molybdenum steels, using a much lower percentage.

Moreover, tungsten carbide cutting tool tips can do a job with one-sixtieth the tungsten required when using 18-4-1 tool steel. A growing percentage of machining is being done with tungsten carbide. Ceramic cutting tips may take still more of the pressure off.

Where Does All the Tungsten Go?

(in thousands of pounds)

Year	Production	Shipments from Mines	Imports	Consumption
1952	7,233	7,244	17,416	8,634
1953	9,259	9,128	27,924	7,734
1954	13,116	13,030	24,132	4,037
1955	15,699	15,551	20,646	8,967
1956*	16,094	16,500	22,400	6,050

*Iron Age Estimate

Source: U. S. Bureau of Mines

BUSINESS

STEEL: No Short Cuts Out of the Woods

Trouble ahead for steel . . . Customer problems are only part of the headaches . . . Shortages mount, will be acute for plate and structurals for some time . . . Costs are climbing above price increase—*By Tom Campbell.*

◆ CRISES are not over for steel officials. Those who deal with industrial relations problems may relax. But the heat is on those who rule the order roost and who hope to keep customers—even if they don't keep them happy.

Before the year is out there will be pressures on the steel industry to "do something" about certain customers. Already in Washington, propaganda for "limited controls" is gaining some—but not much—headway. The theory here—and it's just a theory—is that some industries are important as defense assists. So they should have special help. The arguments will get nowhere.

What's wrong with this is the same thing that was wrong with it years ago. Before the fancy setup of priorities got very far then, everyone was in the act and had a "ticket." It soon was worth no more than a hunting license. And that was what it became; a license to hunt but no assurance that one would "find." This method of dividing up the shortage will not be tried again; at least under this Administration.

Doing Its Best

If it is to keep others from trying to run its business, the steel industry will have to double time its "we love the customer" actions. But in addition to this it must supply quickly those who are in "dire" need of steel. That it is trying to do.

There is no evidence this week that steel producers are pushing their customers around. Efforts are being made to "see what can be done"—even to the extent of shifting semi-finished steel around. Maybe some steel users question that much is being done. But that is normal for the course when you are in trouble.

Tough Times Ahead

The sad part for steelmakers is that they face a lot of headaches before things clear up. For one thing the shortage of plates and shapes is embarrassing. It is true that producers are doing all they can. But it is also true that plate and structural shape users have heard all this before. What they want is material.

The steel strike and the slowness in getting the steel expansion program off the ground has aggravated the plate and shape picture. It may be late 1957 before there is any real relief—the kind of relief that most users would like to see; to be able to order steel and stand a chance of getting it reasonably soon.

Even though they have their critics, conversion deals, premium prices and export steel are helping out in the present dearth of plates and shapes. But before this fall it is a certainty that steelmakers will be clobbered with a heavier-than-expected demand from the auto people. This will tighten up the whole picture.

Auto Background

Used cars have sold like hot cakes in recent months: there is an actual shortage of good (and not-so-good) used cars of recent vintage. There is no sign of any

What the Cards Show for Steel

letup in the demand for such units. On top of this, the realistic cleanup of 1956 cars has been too clean in some areas of the country. Believe it or not, there have been serious spot shortages of new cars over the past few months and there will be more of these paradoxes.

What does that mean to steel users—and producers? It surely means that 1957 model sales will get off to a much better start than did 1956's a year ago. And if that happens, it means too that the steel orders which were "just to take care of dealers' stocks" will be a big starter with much heavier orders to follow from Detroit and other auto centers.

This splurge of steel business from auto people is coming at a time when: (a) seasonal demand for steel is picking up in other lines, (b) an attempt to make up strike losses is being made and (c) smart purchasing agents are sensing a pickup in general business which anticipates more defense spending. That means that between now and next April those in steel whose job it is to mollify irate customers now have their jobs cut out for them.

If that was all that worried steel makers, things would not be so tough for them. But they face increased costs that will make the recent $8.50 a ton price increase look mighty small. Most steel people did not expect the fast and high pass along after the steel price raise. Many manufacturers tacked on plenty more than the steel advance. They claimed that they were only "catching up" to what they did not add a year ago.

Costs Climb

The main thing here is that prices did go up and are still going up; including the very things steel producers use, and hope to use in their expansion programs. But that isn't all. Scrap went up more than wishful thinkers in steel industry thought it would go up. Chances of a crackdown on export of steel scrap are small. Even though Japan is believed to be reselling some American plate and thus needs more scrap to make up for this by-play, she holds the cards; she is building ships that we need.

Steel industry firms will have to put up with higher scrap prices, higher pig iron costs and heavy freight costs to insure safe ore supplies this winter. Lake boat engineers, masters et al picked the lulu of a time to hit U. S. Steel over the head for recognition and a healthy wage package. This little fracas plus the steel strike has cost the steel industry a net loss of close to 9 millions of tons of iron ore from the stockpiles. It can ill afford to lose this much ore to the Lower Lake stockpiles. (See Raw Materials, p. 56)

Here Comes John L.

While the industry may not be hurt seriously by the ore loss, it is silly to say it will not be affected this winter. There will be spot shortages: most of all there will be much higher emergency freight costs and mining costs—that the industry had not figured in its higher steel prices. As if that weren't enough for the sturdy souls who are being nailed on the steel shortage, they still must face John L. Lewis!

The "old man" is letting new industry negotiator Fox get his wind. He will probably need a second wind when the demands of the old master reach him—if they have not already done so in private. It is a safe bet that there will be a big wage bill in coal soon: steel firm captive coal mines make up the bigger part of the bituminous tonnage.

What the second quarter of next year will bring the steel industry is something else again. Eliot Janeway, maverick economist and a high-batting-average-crystal-ball-gazer, sees trouble ahead if the FRB keeps the screws on credit. While he thinks there is a possibility of a serious credit squeeze that would throw autos into reverse next April, he is still calling it "perhaps" or "maybe." By the same token it is just as possible that we may keep going and tote up a 6.5 million or more sales year for the 1957's.

The steel industry will come through its crises by next spring. But the heavy spending for capital goods—new plant and equipment—make your chance of easier steel in the first half of 1957 look mighty slim.

The heavy capital spending is going to continue in spite of tighter money as a result of the FRB policies. Only a few expansion plans have been killed or postponed, although the intent of the squeeze was to drive fringe borrowing out of the money market. This will keep many steel products tight for some time.

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BUSINESS

How the Administration Looks at Controls

▪ Despite needling from some consumers and "hot tip" rumors around Pittsburgh and Chicago, the Administration is not considering any type of end-use controls over steel.

▪ The steel pinch has increased only slightly the running inquiries from some users as to the possibility of controls, usually a modified end-use control for the benefit of defense-supporting industries.

▪ But even a flood of requests wouldn't change the situation. Here's why:

▪ The Administration has made much of free enterprise philosophy, and wouldn't leave it lightly, certainly not for political reasons. Any businessman hoping for government help in fighting the steel supply situation might as well give up.

IRON ORE: How Imports Avert Shortage

Foreign ores will pick up much of the slack from strikes on the Lakes . . . Losses are more than 13 million tons . . . Pittsburgh Steamship's strike will force transshipment from Coast—By *T. M. Rohan.*

◆ IT TOOK a precedent breaking labor settlement with supervisory personnel to do it, but just about all the Great Lakes ore boats that will float will have a full head of steam this week.

Reason for the rush is to make up over 13 million tons of shipments lost by the tie-up of all but a dozen or so boats during the steel strike and an additional month's tie-up of the 58 boats of U. S. Steel's Pittsburgh Steamship Div., largest carrier on the Lakes with 40 pct of total capacity.

The lost ore will cause some scrambling and transshipping, and will bring into its first real importance foreign ore as a major factor in averting a serious ore crisis this winter.

With extension of the Great Lakes season well into December, this year's total of Lakes shipments should reach 76 million tons, despite the strike loss of 13 million tons. To Sept. 3 this year, the fleet had shipped 42.6 million tons compared with 55.7 million a year ago.

Early Start

The gap would have been larger but for the fact that all ships were out early this year in anticipation of an over 80-million-tons year on the Lakes. By July 9, when the steel strike slowdown was getting under way, they were running 1.3 million tons ahead of a year ago and setting weekly records. But after the strikes were cleared up, the deficit was 13.1 million tons.

The trend to foreign ores in the U. S. will get a healthy push because of the strike. And for the first time, development of foreign ore sources will start to pay off in helping to avoid a possible emergency.

Originally, about 30 million tons maximum was expected to be brought in. But because of the tie-up of U. S. Steel's Lakes ships, the corporation's Pittsburgh mills will probably get much more Venezuelan ore transshipped from Baltimore or Philadelphia.

This will boost imports to about 34.5 million tons compared with under 23 million last year.

No Winter Halt

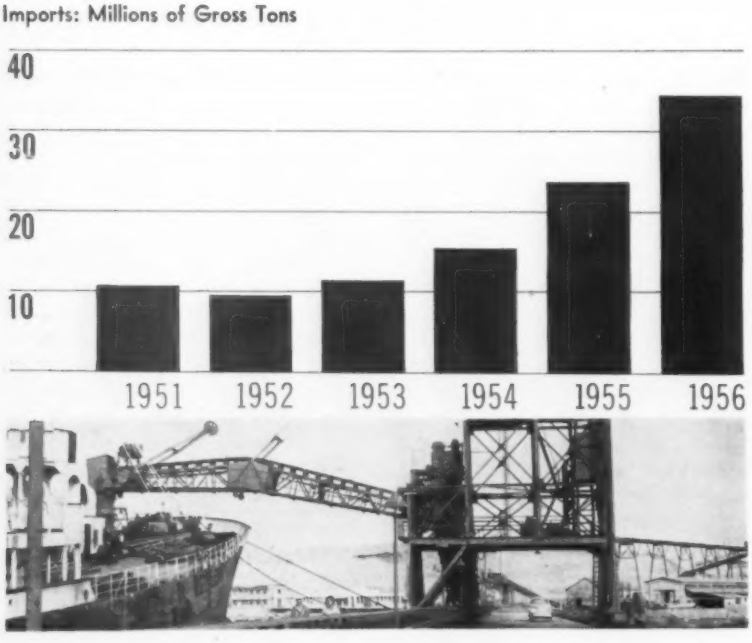
Imports can also be continued into the winter after the Lakes region goes into deep freeze. Until then, the bulk of the Lake Superior ore will probably be sent to mills in the Chicago and Cleveland districts.

The two-month tie-up of its Great Lakes fleet set U. S. Steel back about five million tons and about that additional amount will probably be imported from Venezuela and Labrador.

Before the development of foreign ore sources, loss of a month's shipments at the height of the season would have been a serious blow — although ore men still boast no furnaces have been cooled in recent years for lack of ore.

Increases in Canadian shipments have helped considerably in keeping the ore situation from becoming a crisis. As of Sept. 3, Steep Rock shipments had reached over two million tons compared with 1.5 million tons a year ago. With other increases, the Canadian total at that time was 2.6 million tons.

Growing Importance of Foreign Ore



In new mining developments, Reserve Mining Co.'s Silver Bay, Minn., taconite plant (being dedicated this week) has shipped 1.9 million tons of pellets this year. Reserve is owned jointly by Armco and Republic.

Because a steel strike stops consumption of iron ore as well as shipments, reserves on hand are only about three million tons less than a year ago. And this spread will probably continue until start of a new season next April. As of the end of August there were about 36 million tons on hand compared to over 39 million a year ago. Stocks on hand at the beginning of the shipping season April 1 this year were 21.3 million tons and in years gone by have been considerably less.

Iron ore shippers also face the prospect of a moderate price squeeze. They announced firm prices for the year and now face increased costs through unionization of ships' officers as well as raises for unlicensed seamen, many of whom are in the CIO Steelworkers.

The Pittsburgh Steamship tie-up was brought on by a strike of 414 mates and engineering officers who found it more profitable to be union men than supervisory personnel. Settlement involved formation of two new labor unions from trade associations and almost complete unionization of the fleet. Only personnel excluded are the cooks, who didn't want to join, and ship captains.

Settlement Terms

The walkout occurred shortly before the end of the steel strike when the mates and engineers demanded recognition. Since they were classified as supervisory personnel, the National Labor Relations Board was unable to act, so voting was conducted by the American Arbitration Assn.

Settlement called for a 5.5 pct increase per diem rate with time and a half for overtime. Previously, they were on salary with no hourly limit. Other benefits are supplemental unemployment benefits, based on the steel formula, pension plan improvement.

RAW MATERIALS

GREAT LAKES: Deepen Channels

Connecting channels will be deepened under program starting next year . . . Eventual cost will be $150 million to tie in with St. Lawrence Seaway . . . Means more ore.

◆ DEEPENING of the Great Lakes Connecting Channels, a project which is scheduled to begin next spring, will give a big boost to ore boat traffic when it is completed in 1962.

The channels to be deepened include the Detroit River, Lake St. Clair and the St. Clair River, connecting Lakes Erie and Huron; the St. Mary's River, connecting Lakes Huron and Superior; and the Straits of Mackinac between Lakes Huron and Michigan.

All the channels will be deepened to a minimum depth of 27.5 ft and the whole project will cost an estimated $150 million.

Ready for Bids

Bids for the first phase of the work, the deepening of the Amherstburg Channel in the Detroit River, will be opened Oct. 9 and work is scheduled to begin not later than next April.

It is significant to note that the connecting channels will be cut to the same depth as those now being constructed in the St. Lawrence Seaway. Thus, the connecting channels will extend the benefits of the Seaway beyond Toledo to the Upper Lakes and to the junction of the mid-continental waterway system at the Calumet-Sag in Chicago.

How does the project benefit the iron ore industry?

Of the more than 250 ore boats presently in use on the Great Lakes, some 20 have a draft of from 25 to 26 ft. Deepening the connecting channels will allow the boats to use valuable space which previously was wasted because of shallow water.

It is estimated that these 20 boats will be able to carry an additional 1 million tons of ore in any given season. Thus, that much more ore can be shipped down the Lakes in the same period of time and at no extra cost.

Larger Drafts

In addition, any other boats that are built in the future can allow for larger drafts which will eventually increase the amount of ore to be shipped in one season beyond the anticipated 1 million ton increase.

At the same time, other large bulk carriers, such as coal carriers, will be able to carry bigger pay loads beyond Toledo to Detroit and as far as Chicago.

Biggest Job

Deepening of the channels is one of the biggest jobs ever undertaken by the Army's Corps of Engineers. It involves the removal, through drilling, blasting and dredging, of 44 million cu yds of earth and rock.

Army engineers point out that the whole Great Lakes project is bigger, money-wise, than the United States' share of Seaway financing. They add that the job is not dependent on the Seaway for economic justification but was authorized solely on the basis of inter-lake traffic benefits.

Bronze Stars

American Smelting and Refining Co. will spend over $1.25 million to expand its facilities for continuously casting bronze foundry alloys at Perth Amboy, N. J.

Two new continuous casting furnaces will be installed in an enlarged plant structure to boost capacity by about 50 pct.

ASARCO turns out cast bronze mill rods, tubes and shapes of more than 30 different alloys in lengths up to 105 in.

TRACTORS: Hard Pull For Fewer Sales

A significant drop in wheeled tractor sales this year means tough plowing ahead for the industry . . . But improved tracklayer and rotary tiller sales are bright spots . . . Capital outlays are down.

◆ A MARKED DECREASE in tractor output this year finds the tractor industry looking back at peak years from the lowest rung on the production ladder since World War II.

Best estimates for 1956 indicate that the number of wheeled tractors—backbone of the industry—that will be turned out by the nation's 154 manufacturers may barely reach 230,000 units. In 1951, the industry's best year, wheeled tractor output totaled 559,973 units.

Two other less important segments of the industry, tracklaying (continuous belt) and garden tractors are faring somewhat better. In fact, it is possible that tracklayer sales may hit an all-time high this year. Unit sales have risen fairly consistently since 1947, when 37,607 were turned out. Average monthly sales in the first half of this year were 5100 units, compared to 4100 in 1955.

Designs Improved

Garden tractors accounted for 168,009 units in 1947, climbed to a peak of 211,795 units in 1953, and have since leveled off to about 190,000 per year.

According to the 1954 Census of Manufactures now being released, the relatively poor showing of wheeled tractor sales in 1954 compared to 1947 was counterbalanced, to some extent, by a 56 pct increase in the value of shipments during the period.

Shipments by the industry in 1947 were valued at $332,100,000 in 1947, but by 1954 rose to $516,000,000.

After taking into consideration the devalued 1954 dollar compared to the 1947 dollar, the gain in value of shipments by the tractor industry during this period can be attributed partly to the steady increase in tracklayer sales and partly to increased value of all units due to design improvements. In an effort to boost sales appeal, manufacturers have incorporated more horsepower, more attachments and luxury touches—such as power steering — into tractor design.

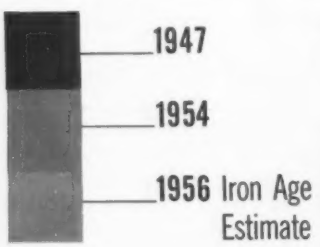
Competition Is Tough

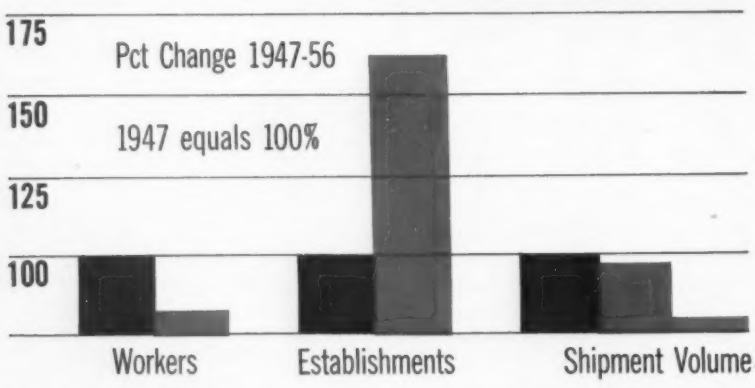
Spurred by declining sales, tractor producers tackled cost-cutting projects which resulted in an employment drop from 77,300 in 1947 to 64,700 in 1954—a difference of 16 pct. However, remaining employees boosted their total paycheck from $227.8 million to $287.1 million during that period, or an increase of 26 pct.

The lures that attracted 60 new companies into the industry between 1947 and 1954, bringing the total from 94 to 154, have since dwindled. These firms are now faced with the problem of competing for fewer sales. Many are seeking to diversify their lines.

Companies which produce garden tractors are filling in the gaps in their production schedules by making rotary tillers in small sizes—an item that is growing in popularity.

It's Tough Going for Tractors





Source: 1954 Census of Manufacturers

Shipments based on '47 dollars

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

HOUSEHOLDS: 20 Million More by 1975

Bureau of Census projection indicates 700,000 to 1 million new households a year . . . New families create new market fields for metalworking industries . . . But caution is advised in utilizing figures.

◆ IF YOUR COMPANY gages its sales, production, or expansion plans on the household unit as a measure of consumer demand, then during the next 20 years you can look for an average annual increase in households varying between 700,000 and 1 million units.

The number of households in the U. S. as of April, 1955, was 47.8 million. By 1975, the figure will have grown to between 61.6 million and 67.4 million, according to the Bureau of the Census. By 1960, a total of between 50.5 and 51.8 million households is indicated.

Word of Caution

These figures are the results of a series of four projections based on extension of changes in marital status, household status, and in growth of population during the postwar period. Since this was a period of high employment, each of the four projections is consistent with continued high employment levels.

In announcing the projections, however, the Census Bureau cautioned that its figures are not to be taken as forecasts or predictions. They are made to show the number of households which would result under several reasonable assumptions about future population changes. The four series imply an increase in households of 30 to 40 pct for the 20-year period.

It should also be noted that the projections do not make allowance for changes resulting from a war or other catastrophe.

Appliance, hardware, plumbing and home furnishings manufacturers especially should keep in mind that the increase in the number of households which may take place between now and 1975, may not be identical with the volume of housing construction.

Changing Factors

Certain factors which may have bearing on the number of households formed include changing standards of living, changes in the amount of available housing, and changing costs of housing construction.

There are other factors which may create demand for additional housing without implying any change in the number of households. These include changes in the types of living quarters in demand locally because of a change in average size of the family, the desire to hold more than one home for use of the family, and population shifts.

Migration is particularly important during periods of rapid industrial expansion, causing local housing shortages in areas of heavy in-migration and creating vacancies in areas of out-migration. The wideawake sales manager will follow these shifts in population when planning his marketing campaigns.

Not Uniform

The growth in the number of households is not likely to be uniform during the 20-year period. Between 1955 and 1960, the rate of increase appears likely to range between 1.07 and 1.57 pct. Between 1970 and 1975, it may range between 1.52 and 1.88 pct. This can be contrasted with an annual increase of 2.44 pct between 1900 and 1910. From 1950 to 1955, the rate was 1.84 pct.

Nature Works For Household Goods Manufacturers

▪ Producers of household consumer goods have no long range problems in finding new markets. Time and human nature take care of that.

For example: the number of married couples in the U. S. in 1955 totaled 37.6 million. By 1975, the number will have increased to between 48.2 and 50.6 million couples.

On a yearly basis, that will average an increase of up to 857,000 new married couples per year for the next 20 years—quite a sizeable new market considering that between 1950 and 1955, the annual average was only 291,000.

The census figures have some other interesting tales to tell. For instance, there will be many more unmarried women living alone in 1975 than today. The percentage of households maintained by unmarried women in 1955 was about eight. But by 1975, it could climb to as high as 13 pct.

The number of men who are content to remain bachelors is expected to remain a constant 4 pct during this same period.

EXPANSION

NICKEL: More Pigs Coming

National Lead Co.'s new plant near Philadelphia will help relieve critical shortage . . . Steel mills are seen as biggest customers . . . Sinter shipped from Cuba.

◆ CONVERSION of a small steel mill into the nation's only commercial nickel refining plant by Nickel Processing Corp. of New York, will offer some relief to the nation's nickel-starved steel mills.

The plant at Crum Lynne, Pa., near Philadelphia, started operations June 1, and shipped its first nickel orders to customers recently. Capacity operations are expected by the end of the year.

Carleton Rose, vice president of National Lead Co., of which Nickel Processing Corp. is a subsidiary, said the new plant was financed entirely through retained earnings.

Meets U. S. Specs

A special refining process was developed by company metallurgists to handle nickel oxide sinter being shipped in from Cuba, where Nickel Processing Corp. is operating the U. S. Government's mines at Nicaro. The nickel produced in Crum Lynne is in accordance with U. S. stockpile specification P-36, in 50-lb pigs.

The plant, with 83,000 sq ft under roof, is situated along the Pennsylvania Railroad's New York to Washington right-of-way. The plant has additional acreage for expansion, Rose said.

Special equipment was installed, including a revolving casting machine, to supplement two electric induction furnaces formerly used in steel production. Enough skilled and semi-skilled workers were available in the local area to staff the plant.

Aside from its commercial production, Nickel Processing Corp., produces metallic nickel under a contract with General Services Administration, for the U. S. Government stockpile. Its commercial production is aimed at the steel market, Rose said.

The recent shipments were sold at prevailing prices to several steel companies, for the production of stainless and other nickel-bearing steels.

The company is assured adequate supply of nickel oxide sinter because of its connection with the Cuban mining operation. At present, the Nicaro plant is enjoying record-breaking production of nickel oxide. The current annual rate is in excess of 31 million lb.

HOT OFF a casting machine, these much-needed nickel pigs are stacked prior to shipment at Nickel Processing Corp.'s new plant at Crum Lynne, Pa. Most of the plant's output is destined for steel industry use.

Fast Tax:

U. S. Steel request boosts its total to $459 million.

Latest applications for places on the steel fast tax write-off band wagon have come from U. S. Steel Corp., for a $94.4 million expansion program at its Fairless Works, Morrisville, Pa. Alan Wood Steel Co. also asks for tax help with its $7 million project at Conshohocken, Pa.

This brings the total applications for fast tax write-offs filed with Office of Defense Mobilization from the steel industry to a whopping $781.2 million worth of expansion, of which $459 million is from U. S. Steel.

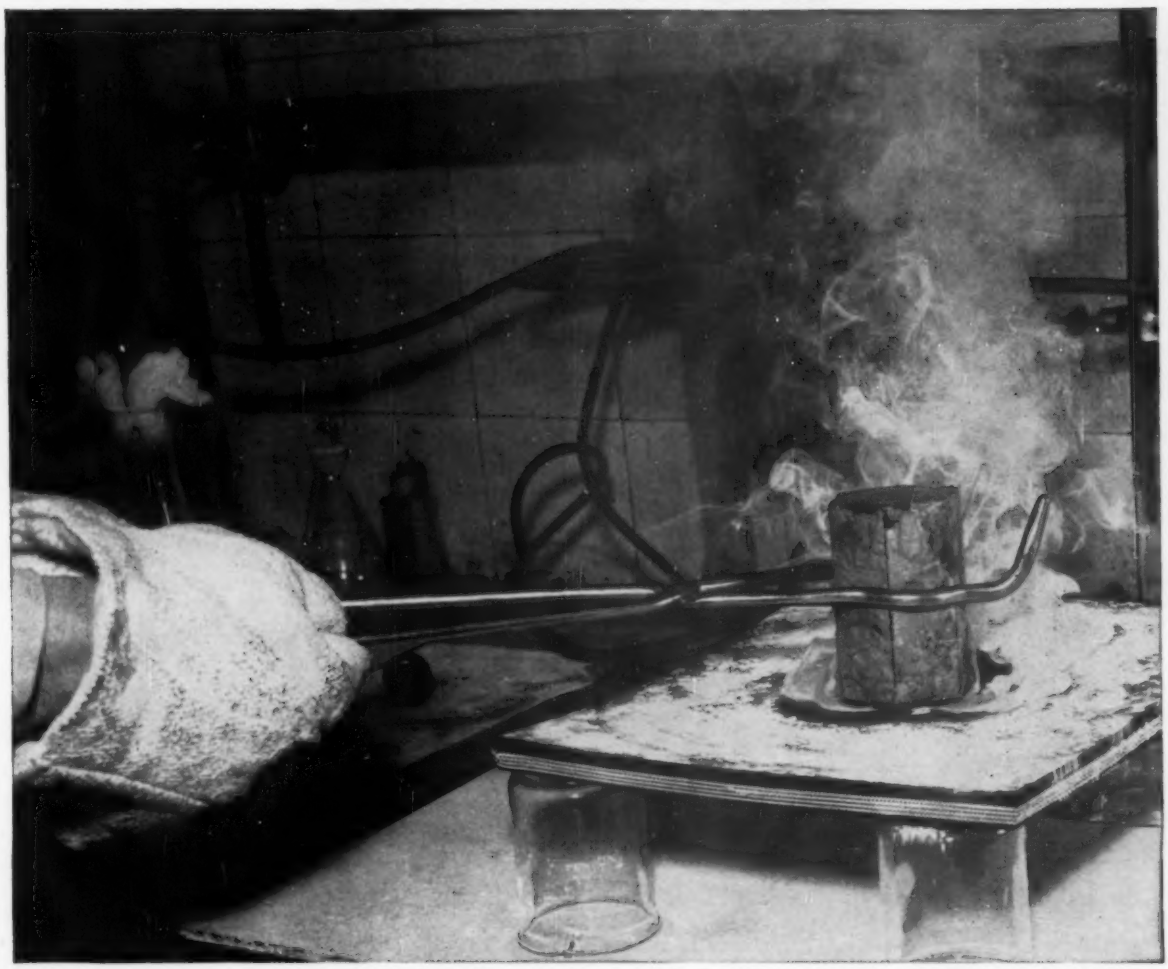
Breakdown

The latest statement from the corporation breaks down something like this: Openhearth furnace and soaking pits, $48.9 million; blast furnace, $13 million; ore sintering, $8.5 million; coke ovens, $19 million; and mill additions, $5 million.

The Alan Wood request suggested that tax asistance be granted to the tune of $3.5 million worth of pig iron and steel ingot facilities and $3.6 million for powdered iron facilities.

Continued requests rolling in from the steel producers indicate that the industry believes there is at least a sporting possibility that a favorable decision will stem from the government study to see if current shortage of certain items warrant reopening of fast tax write-offs for the industry.

B.F.Goodrich



Red-hot metal won't burn through this B.F.Goodrich conveyor belt

New fire curtain means longer life for hot-material belts

SCORCHING chunks of metal that sometimes land on foundry conveyor belts won't burn holes through a B. F. Goodrich conveyor belt with the built-in fire curtain.

This new protective shield is two layers of glass fabric that B. F. Goodrich puts into the top cover of hot-material conveyor belts. If a hot chunk of metal accidentally drops on the belt, the rubber cover chars at the spot, but only down to the glass fabric fire curtain. Since the hot object doesn't penetrate the glass fabric barrier, the belt keeps its strength and so, of course, lasts longer than belts without this protection.

To demonstrate the effectiveness of the fire curtain, tests were run on two hot-material belts. One belt had the B. F. Goodrich fire curtain protection; the other did not. A red-hot steel bar was placed on each belt. It burned through the rubber covers on both belts. And it burned a hole clear through the unprotected belt. But the B. F. Goodrich fire curtain stopped the burning chunk, so that the body of the protected belt was undamaged.

The fire curtain protection is ideal for foundry service where burnt holes are the major cause of short belt life. It can be built into any B. F. Goodrich hot-material belt. Talk it over with a B. F. Goodrich distributor and see if this new belting improvement is the answer to your hot material problems. *B. F. Goodrich Industrial Products Company, Dept. M-761, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

EXPANSION IN INDUSTRY

Centralization:

Baldwin-Lima-Hamilton organizes E & I Div.

Baldwin - Lima - Hamilton Corp. has organized an Electronics and Instrumentation Div. with headquarters in a new $3 million plant at Waltham, Mass.

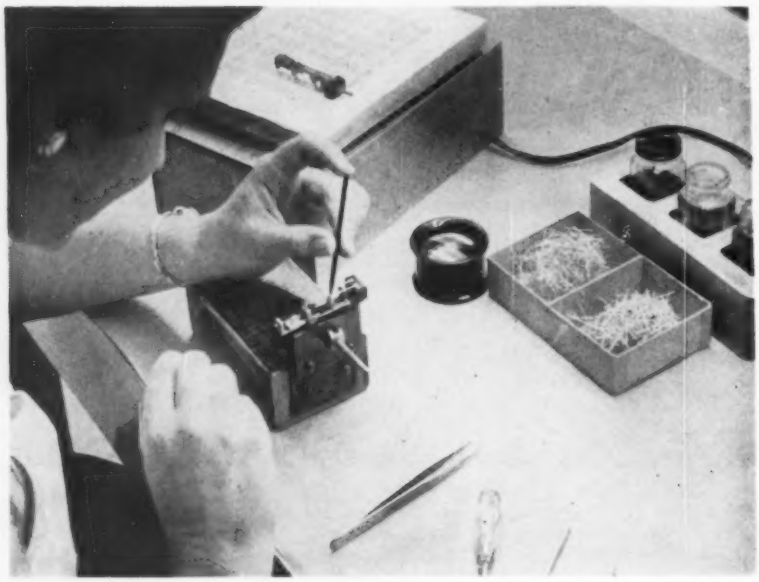
The new division consists of the men and machines of Ruge deForest Inc., Cambridge, Mass.; O. S. Peters Co., Washington, D. C.; Sonntag Scientific Corp., Greenwich, Conn.; and Testing Equipment Dept. of the Eddystone Div., Baldwin-Lima-Hamilton.

The three other companies had been functioning separately, but were coordinated since their purchase by B-L-H.

The major reorganization is expected to yield more than one-third greater production than the combined previous total capacities. Initial product output will total about $700,000 in value of products. Company expects this to rise to $900,000 per month by the end of 1956.

New division will manufacture testing instruments, SR-4 strain gages and testing systems, and testing machines and allied equipment.

Of the 102,000 sq ft of floor space in the new plant, 92,000 is devoted to manufacturing and 10,000 for offices. There are 120 separate pieces of production equipment including a complete machine shop, and a 5-ton bridge crane.



(Left) WIRE finer than a human hair is woven into the grid of a SR-4 strain gage at the newly formed Electronics and Instrumentation Div., Baldwin-Lima-Hamilton Corp. New plant was constructed to house the new division at Waltham, Mass.

Power for Aluminum

Westinghouse Electric Corp. will supply $4 million worth of rectifier equipment to provide DC electricity to two aluminum potlines of the new Kaiser Aluminum & Chemical Corp. plant at Ravenswood, W. Va.

The Westinghouse plants at Sharon, and E. Pittsburgh, Pa., and Newark, N. J., will supply the equipment, including rectifier transformers, metal-enclosed pump-rectifier assemblies complete with switching and control equipment, power circuit breakers, anode and cathode circuit breakers.

Expansion Briefs

Cal-Metal Pipe Corp. of Louisiana, Baton Rouge; installing a new electric resistance weld continuous mill to produce line pipe for the gas, oil, water and construction industries.

E. W. Bliss Co., Canton, O.; acquired rights to manufacture and sell the patented, fully-crowned tooth gear type coupling for rolling mill equipment, from American Flexible Coupling Div., Zurn Industries Inc., Erie, Pa.

Plasteel Products Corp., Washington, Pa.; will acquire controlling interest in Clad Rex Steel Co., Denver, Colo.; acquired company uses a patented process for bonding vinyl plastic sheeting to metal.

The Garrett Corp., Los Angeles; AiResearch Div., will expand its European markets.

Metal Hydrides Inc., Beverly, Mass.; will construct a new sodium borohydride plant; production scheduled for early summer 1957; cost about $5 million.

Arnolt Corp., Warsaw, Ind.; makers of marine spotlights and formed steel tubing, new plant will boost production space 50 pct.

Where on earth will you find such machinery...

Battery of four No. 4A Warner & Swasey turret lathes for accurate machining of heavy gear blanks to 28" diameter.

...at Illinois Gear, of course.

Pictured here is a battery of large precision turret lathes for machining heavy gear blanks *up to 28" in diameter!*

These machines are typical of all the precision equipment that makes *Illinois Gear* the most modern, best equipped and the largest gear manufacturer in the world . . . equipment that offers a new concept in the manufacture of finest quality gears.

Combine this with the skilled craftsmen who *know how* to operate this equipment and you have the reason why *Illinois Gear* can produce gears that measure up to your most demanding specifications . . . why *Illinois Gear* can make and fulfill delivery promises.

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Look for this mark ILG® *the symbol on finer gears*

Gears for Every Purpose ... one gear or 10,000 or more

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Twice around the clock or less—and your order for TIMKEN® 52100 steel is on its way to you

ALL it takes is a phone call today to get your rush order of Timken® 52100 steel tubing on its way tomorrow. We ship within 24 hours of your order because we stock 101 different sizes of 52100 tubing—from 1″ to 10½″ O.D., all available for less-than-mill quantity orders.

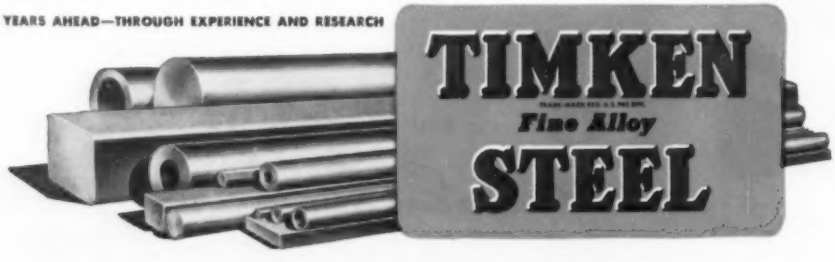
Timken 52100 steel can save you money as well as time. It can be used in place of many more expensive steels for hollow parts jobs that call for a steel that's hard and tough, yet easy to machine. 52100 is through-hardening in moderate sections and can be heat treated to file hardness and tempered back to any desired point.

Timken 52100 steel is ideal for parts such as: aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts, precision instrument parts.

The Timken Company is America's pioneer producer of 52100 steel tubing, and the only company that makes this steel in tubing, bars and wire. Our unequalled experience assures you of uniform steel quality from tube to tube, heat to heat, and order to order.

For immediate delivery of your less-than-mill quantity orders of 52100 steel, write, wire or phone The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

REPORT TO MANAGEMENT

What Labor Endorsement Means

Republicans in general have been congratulating themselves over the comparatively recent discovery of the fact that labor doesn't vote as a block. Instead, union members today exercise independent judgment behind the green curtain of the voting booth.

But while this may be news to many, it has been accepted as a fact for many years by the heads of labor organizations themselves. If the public had the illusion that labor leaders could dictate how their members voted, they saw no point in destroying this misinterpretation. It added to their power.

Now the possibility rises that labor's endorsement of a candidate may be underestimated. Granting that the labor bosses don't control the vote, they still have a valuable political asset.

Labor's endorsement of a candidate assures him of the use of labor's organization, even if not it's complete voting support. It means a well-organized group of doorbell ringers, poster hangers, petition signers, meeting goers, and a claque at any public meeting guaranteeing "spontaneous" applause.

That's why labor support is still an important factor, despite the fact that union leaders can't "deliver the vote" as was once assumed. It takes years to build an organization like that—and it's expensive too. So don't underestimate a labor endorsement. It still has value.

Do You Know Your Tax Depreciation?

If your company is still using the traditional straight-line tax depreciation method, you probably are missing out on a 10 pct or better improvement in after-tax returns.

This is a conclusion of a study of tax depreciation methods by the Machinery and Allied Products Institute. It analyzes the "effect of the alternative tax depreciation methods on the after-tax return from a depreciable asset."

The Internal Revenue Code authorizes two new methods of tax depreciation which provide for significant acceleration compared with the traditional straight-line method.

The double-rate declining-balance method charges off approximately two-thirds of the cost of an asset over the first half of its estimated life. The other, known as the sum-of-digits method, charges off almost three-fourths in the same time.

Substitution of either new method, MAPI reports, effects a substantial improvement, whatever the level of after-tax return with straight-line depreciation.

It's further pointed out that the increase in equity return rates from the new methods is greater when part of the capital is borrowed than when it is entirely equity.

For very short service lives, the double-declining-balance method is more favorable. For longer life, the sum-of-digits method is more favorable.

Why It's Important

It's pointed out that over half of the fixed capital expenditures are accounted for from tax depreciation allowances.

It's obvious that underdepreciation results in what should be justifiable capital recovery being taxed as income. In these days, where money for capital expenditures is becoming more difficult (and expensive) to obtain, every precaution possible should be taken to safeguard funds for capital expenditures.

INDUSTRIAL BRIEFS

Dad Burned . . . Basic Refractories, Inc., will locate a $400,000 Distribution Center in Hammond, Ind. Upon completion next June, the center will provide the Chicago steelmaking district with a third producer of dead burned dolomite. This granular refractory material is used in more than 90% of the nation's production.

From Ore To Isotopes . . . "The Petrified River — The Story of Uranium" is a 16 mm. color and sound film sponsored by Union Carbide and Carbon Corp. in cooperation with the U. S. Bureau of Mines. The film covers the story of uranium in the U. S. from prospecting for ore to the peaceful uses of atomic energy and radioisotopes.

Chilean Beads . . . A complete line of welding electrodes are now manufactured in Santiago, Chile, by a new company being formed with joint ownership by A. Montero y Cia. S. A. and Harnischfeger International Corp. The firm will be licensed by Harnischfeger Export Corp.

Washington Address . . . Clyde B. Jenni, chief metallurgist at General Steel Castings Co., Eddystone, Pa., is now associated as chief of the Castings Branch of the Iron and Steel Div., Business and Defense Services Administration, Washington.

Pipe Dreams . . . "The Armco Steelmobile" will begin a 16-month tour of U. S. cities. The steel pipe trailer, made by Armco Drainage & Metal Products, Inc., is a large custom-built trailer, holding a complete exhibit of municipal and highway construction products. The pipe is made of finely finished stainless steel instead of plain carbon steel.

Head In The Clouds . . . Lear, Inc. has opened a new research and development laboratory at Santa Monica Municipal Airport. With the aid of elaborate computing and test equipment, 100 engineering specialists develop instruments and equipment for airplanes and missiles of the future.

Barging In . . . Six 195-ft covered hopper barges, which will carry chemical fertilizers, soda ash and other bulk commodities on the Mississippi and Illinois River systems, are being completed for use by the Olin Mathieson Chemical Corp. Constructed by Dravo Corp., Pittsburgh, the all-welded steel barges will be delivered to Catlettsburgh, Ky., for immediate use.

Short Wave Set . . . General Electric has transferred its Microwave Lab. at Stanford University to the company's Power Tube Dept., in a move to strengthen the link between product research and manufacturing.

Arm of Caterpillar . . . Englehart Manufacturing Co., Davenport, Iowa, has been acquired by Caterpillar Tractor Co. of Peoria, Ill. Caterpillar issued 20,000 shares of its common stock for all of Englehart. The company will be operated as a wholly-owned subsidiary of Caterpillar.

Windows Open . . . Valley Metal Products Co., subsidiary of the Mueller Brass Co., has purchased all of the machinery, equipment, inventories, patents, trademarks and trade names of the Window Div. of the Industrial Machine Tool Co., Inc., Fenton, Mich. The newly acquired division manufactures awning-type aluminum windows under the trade name of "Tru-Seal."

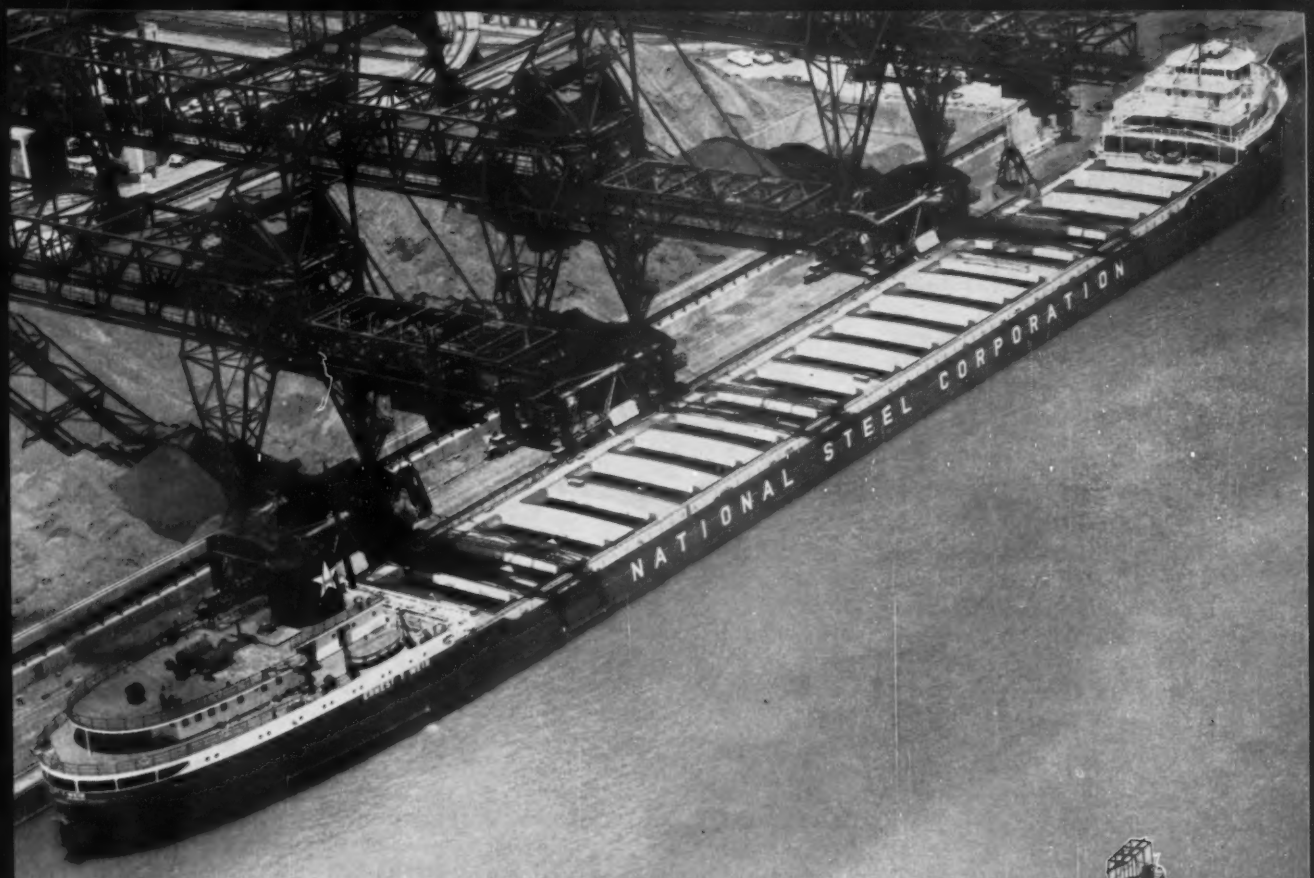
Diamond With Holes . . . Diamond Manufacturing Co., Wyoming, Pa., producer of perforated metal products, has established a new affiliate, Diamond Perforated Metals Co. in Gardena, Calif.

Win, Place and Show . . . National Prizes of $1000, $750, $400, $200 and $100 are being offered in each of two classes in the 3rd Product Development Contest of the Steel Founders' Society of America. Class I includes all persons not employed by the industry and Class II covers its employees. The contest closes midnight June 1, 1957.

Nice Assignment . . . The Black & Decker Manufacturing Co., opened a new sales and service branch in Phoenix, Ariz., to furnish complete repair and service facilities for users of Black & Decker portable electric tools in the area.

Brass Becomes Fabricated . . . The Waterbury Brass Goods Div. of The American Brass Co. now becomes the Fabricated Metal Goods Div. This division manufactures specialties from flat or sheet metal, particularly products of small size and close tolerance.

Uranium is Sunk . . . An underwater facility for examining intensely radioactive uranium metal is in operation at the Hanford atomic plant. Four water-filled concrete pools in an atomic reactor building at the Washington state plutonium project now serve as a "liquid lab." Under the shield of water, tests are performed on fissionable fuel elements of experimental and production type after the fuel has undergone chain-reaction bombardment in the reactor.



How Great Lakes Steel *launches* quality

You're at 400 feet, banking for a good close look at the unloading operation of the *Ernest T. Weir*. She's packed to the gunwales, stem to stern, with ore—tons of iron-bearing food for Great Lakes hungry blast furnaces.

What's this got to do with turning out top-quality steel at Great Lakes? Plenty! For quality pig iron can only come from quality raw materials—like the *Weir's* rich cargo. And, of course, quality pig iron is the very backbone of top-quality steel.

Control of quality at Great Lakes begins right at the mines. In fact, each ore source is picked with painstaking care. Then, repeated checks in the mines—*double checks* here at the unloading docks—put the quality of Great Lakes raw materials beyond question!

It's that kind of control (from start to finish) that gives our flat-rolled products uniform quality—assures that they will reach our customers exactly when and as ordered. We're ready to talk your steel needs whenever you are.

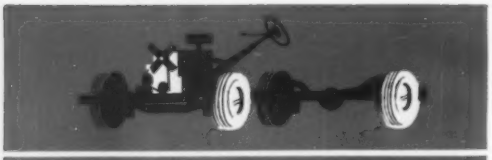
GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

TO ASSURE TOP-QUALITY OPEN-HEARTH STEEL . . . iron ore (shown stockpiled here), coal and limestone—all of known source and quality—are sampled and tested over and over again by Great Lakes Steel raw material analysts.



AUTOMOTIVE ASSEMBLY LINE

Drastic Cuts In S-P Survival Plan

Studebaker-Packard begins its new lease on life with a "lean and hard" program . . . Immediate goal is to maintain first quarter penetration of market . . . Packard Predictor still in future—By *T. L. Carry.*

◆ NEWLY REVIVED Studebaker-Packard Corp. is embarking on the comeback trail with an operating program designed to at least maintain the company's already slim position in the automotive market.

Key to the firm's new approach, according to Harold E. Churchill, president, is a "lean and hard" operating program which calls for an immediate reduction in costs.

Simply stated, S-P hopes that it can maintain its January-April penetration of 1.58 pct while at the same time cutting costs to make a profit by the end of 1957.

Plan for Survival . . . There are three parts to the program—cost, production, market development and product development.

S-P is going to swing the ax to cut out all the extra manpower, equipment and floor space which has been a burden. In addition, individual dealers will be given marketing programs tailored to their local needs and the products themselves will emphasize the price area in which the company is strongest.

It's a job that has to be done, if the company is to survive at all and to some extent it is a big undertaking.

Price of Peace . . . It is generally conceded in the industry that Studebaker for years was burdened with an unrealistic cost because it literally bought labor peace. The same was true to a lesser extent of Packard.

This cost was eliminated when the company was under the leadership of James J. Nance. In fact, Mr. Nance did a great deal to eliminate a lot of other manufacturing costs while he was at the helm.

But at the same time, the company was involved in a product development program which pretty well drained the cash register. In addition, production facilities were scattered and even though a lot of economies were introduced, the cost of making cars was still astronomical.

As a result, the new S-P management has a seven point cost reduction plan which it hopes to have completed within the next 60 days.

Consolidation and Integration . . . Among the major changes, the company will concentrate all its production in South Bend. This includes the Studebaker, Packard and Clipper. All assembly operations in Detroit and Los Angeles will be eliminated. In addition, Packard and Studebaker sales personnel will be combined into one department.

Also, the company hopes to integrate more thoroughly and produce a number of component parts which it previously bought from outside sources.

The big question is, can the company make it?

Evidently, S-P still plans to produce a full line of cars and trucks. There are some in the industry who question the wisdom of this decision.

A few veteran observers believe

End-of-Year Bargain Hunters Face Bleak Winter

▪ People who think that they might pick up a bargain in a 1956 car just before the new model introductions might be fooled.

Passenger car production for August dropped to 402,000 units compared to 448,000 in July. September's production, according to Ward's reports, will be even lower.

As a result, prospects for a neat cleanup of old model cars have never been better for dealers. It's possible that dealers' 1956 inventories may be down to the shortage level by the time 1957 models are introduced.

Early estimates of fourth quarter production place the number of units to be produced at about 200,000 less than were made in the same period last year.

Reasons for the decline may be the result of caution on the part of producers in the face of an inevitable price increase, plus the tight credit situation.

Prehistoric monster?

No. You're looking at the *world's largest dredger* . . . a hungry man-made monster of a machine that can move a mountain of earth in a day.

Imagine the brute power it takes to move this behemoth—even more, the joint-strength it needs to hang together despite the strains and stresses it undergoes! It typifies what's been happening in the earthmoving equipment field. They're making them bigger, more powerful, more rugged.

What helps hold such hard-working equipment together?

Plenty of standard *nuts and bolts.* They have to be strong and flawless, these fasteners . . . completely reliable.

RB&W—A MAJOR AND RELIABLE SUPPLIER

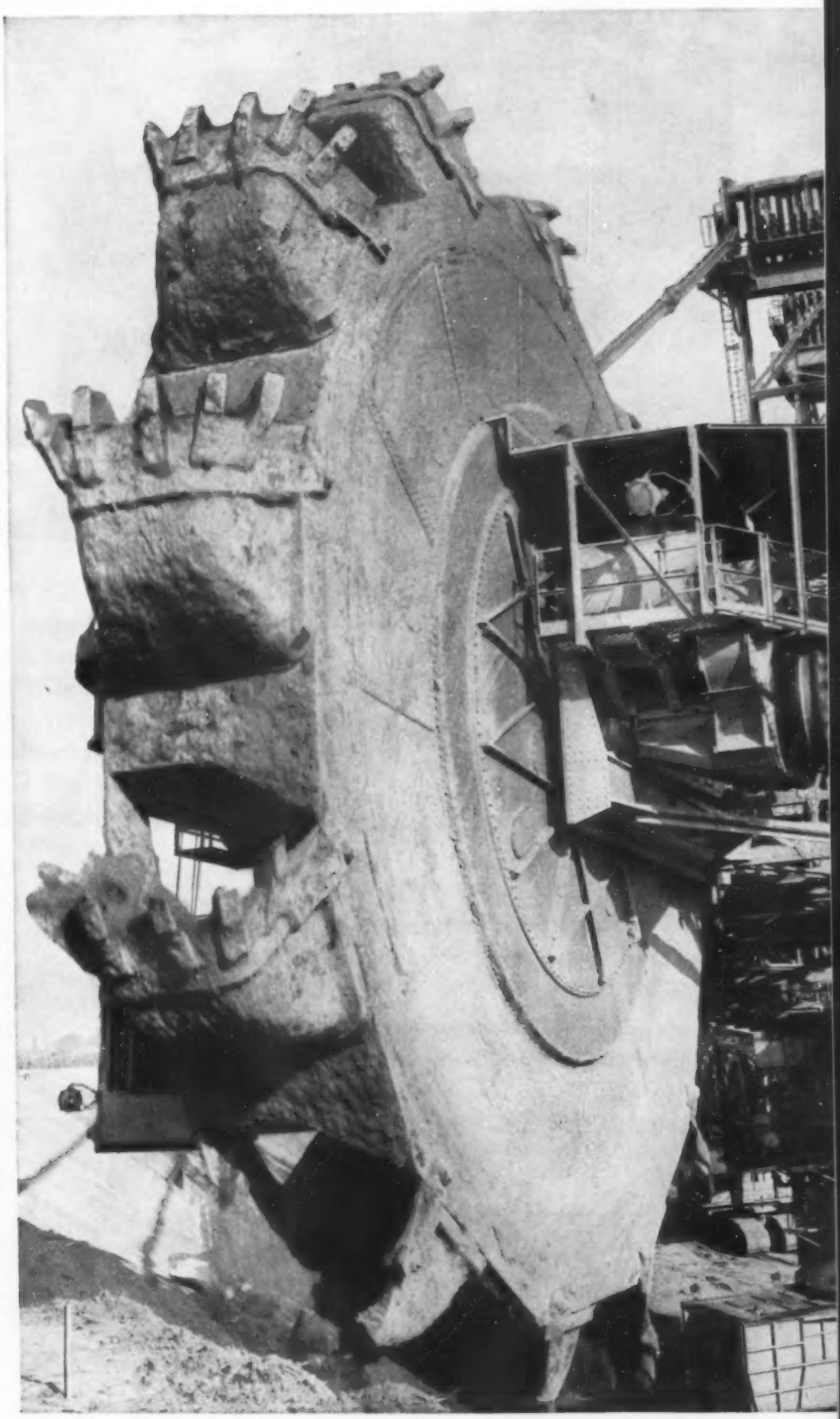
A leader for 111 years, RB&W turns out the finest quality fasteners possible—for the heavy equipment field as for so many other major fields in industry. *Modern facilities, new techniques, long experience* . . . all combine to make RB&W fasteners truly the "strong point of any assembly".

CONTACT THE RB&W "FASTENER MAN"

Proper application of standard fasteners can save you money. Ask the RB&W "Fastener Man" to show you how. Contact your nearest RB&W office.

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; **Distributors from coast to coast.**

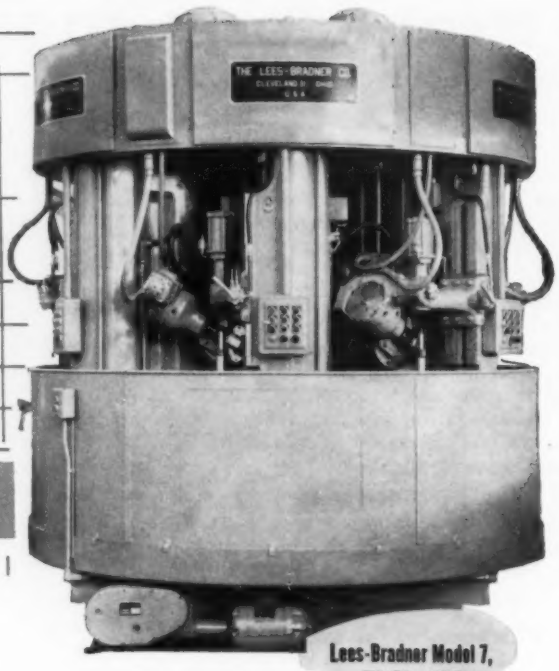


RB&W FASTENERS - *Strong Point of any assembly*

LEES-BRADNER

Sets the HOBBING pace for tomorrow

with 6 machines in 1



Lees-Bradner Model 7, HD 8" x 20" 6-Spindle Rotary Hobber. Also available in single and 4-spindle models.

Here's a complete hobbing production line in one space-saving unit. Actually the Lees-Bradner Model 7, HD 6-Spindle Hobber is six separate and independently operative machines in one. Each hobbing unit incorporates basically the same automatic, high-production features as the remarkable 7 HD Single Spindle Hobber. This includes a heavier, more rugged headstock, heavy-duty column and a 10 H. P. motor.

This amazingly efficient machine not only saves valuable floor space but, with its pushbutton controls and automatic features, actually controls the operator thus reducing the chance for human error or slow-down. Chips and coolant are easily carried away from the headstock by the elimination of flat surfaces.

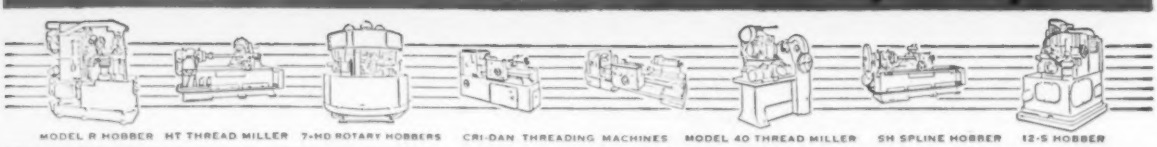
So, if your manufacturing space is valuable and high unit production important, ask your Lees-Bradner representative to give you the story on the ultra-efficient 6-spindle rotary hobber. Write or wire us direct for his name and address in your area.

View of new HD headstock with increased bearing surface between column and headstock, heavier casting, coolant and chip carry-away.

8-Spindle 7-A Rotary Hobbers also available.

the LEES-BRADNER Company

CLEVELAND 11, OHIO, U.S.A.



MODEL R HOBBER HT THREAD MILLER 7-HD ROTARY HOBBERS CRI-DAN THREADING MACHINES MODEL 40 THREAD MILLER SH SPLINE HOBBER 12-S HOBBER

IF YOU THREAD OR HOB . . . GET A BETTER JOB WITH A LEES-BRADNER

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
SEPT. 8, 1956	50,663	15,910
SEPT. 1, 1956	58,472	18,966
SEPT. 10, 1955	82,564	15,982
SEPT. 3, 1955	89,744	15,936

*Estimated. Source: *Ward's Reports*

it would be wiser for the company to concentrate its efforts on just one model which could not be matched by other automakers.

Predictor Offers Hope . . . Their reasoning goes like this: Packard's dream car, the Predictor, was the hit of every auto show in the country this year where it was exhibited. It included a number of sweeping innovations which caught the fancy of all who saw it.

If the company were to produce nothing but the Predictor, it could reduce its tooling and production costs even more and cut its break even point to a low level.

But tooling up for such a job would take too long a time and by the time the car was on the road, chances are that S-P would be even further in the hole.

As it now stands, the wish may be the father of the thought as far as the new operating program is concerned. But there's a good chance the company will be in a better position by the end of next year.

Inventories:

A change in the steel supply picture is due in 30 days

Purchasing agents who have been resting on their steel inventories during the summer with the thought that they needn't worry about supplies are liable to be in for a big surprise within the next 30 days.

The market is becoming tighter every day and the biggest reason is automotive buyers.

But the big pinch hasn't been felt yet and it won't be until October. That's when General Motors Corp. will begin full scale production of its new models.

By the middle of the month every GM car division will be up to its ears in the steel market and even cold-rolled sheet, one of the easier products, is going to become extremely scarce.

Warehouses in the area are holding their breath in anticipation of the stampede that they are sure is inevitable. Right now they are sitting pretty with adequate sheet stocks but they are worried about the future.

Warehousemen say that their chances of replacing their own supplies from the mills aren't going to be any better than the ordinary mill customers. Predictions are that by the end of the year gray markets and conversion deals will be plentiful as dandelions in the spring.

Safe Car Legislation

The threat of Congress considering a safe-car law is now hanging over the industry's head.

The possibility was hinted at during recent safety demonstrations for a House subcommittee held in Detroit.

It's questionable whether or not the government could actually legislate such a thing as safety because of the unpredictable nature of individual drivers. However, it is possible that a law could be passed requiring manufacturers to put governors and other such items on their cars.

The industry has never been more aware of the possibility.

But, as usual, the automakers are going to try to beat the government to the punch. Not by actually introducing governors and such things on the cars but more subtly.

Watch for a definite de-emphasis on hp and speed in the sales pitch for 1957 models. There will be a bigger stress put on safety, but the biggest part of the advertising budget is going to be spent on selling the economy features of the cars.

THE BULL OF THE WOODS By J. R. Williams

THERE'S A FUNNY ONE FOR YA! IN THE SHOP THAT LAD HAS TO RUSH TO KEEP UP WITH HIS OLD GENT!
YEAH, BUT ON THE WAY HOME THE OLD GENT HAS TO RUSH TO KEEP UP WITH THE KID! IT MAKES YOU WONDER--WHO'S GOT THE BRAINS?
IT ALL DEPENDS
J.R.WILLIAMS
T.M. Reg. U.S. Pat. Off.
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WITH CHASE® S-19 PROCESS BRASS STRIP

CHASE S-19 BRASS is *unique* through and through! Special manufacturing techniques give it an exceedingly fine, uniform grain structure, and it has unusually high ductility. It is adaptable for forming or even relatively deep-drawing articles which are surprisingly scratch and dent resistant. They will buff or polish more easily, too.

It takes precise Chase quality control at the mill to produce the superb finish, stiffness and formability of Chase S-19 brass—*yet it costs you no more than commercial soft brass!* Call in a Chase representative for all the facts, today!

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THIS WEEK IN WASHINGTON

Are More Steel Price Hikes Coming?

Capital sentiment indicates that way is being paved for higher steel prices this year . . . Recent increases won't cover depreciation losses adequately . . . Administration helped restrain prices—By G. H. Baker.

◆ GOVERNMENT economists aren't saying so publicly, but privately they expect another rise in steel prices before long.

They reason that the $8.50-per-ton increase put into effect on August 7 falls short of covering the industry's higher wage costs and higher prices of materials. Another increase — but smaller than $8.50 — will necessarily have to be made, probably by the end of the year, they calculate.

In addition, congressmen from steelmaking areas say they "would not be surprised" to see another price increase put into effect late this year. They point out that U. S. Steel President Clifford F. Hood, in announcing price increases early in August, hinted of further adjustments when he said:

No Depreciation Factor . . . "The new prices do not provide a solution to the problem that U. S. Steel faces with respect to inadequate depreciation allowances for the replacement of obsolete and outworn facilities; nor do they attempt to provide a solution to the many problems attending the expansion program upon which U. S. Steel is currently engaged."

(It's an open secret in government circles that the steel companies had planned in early August to increase prices by about $10 per ton, but were talked out of it by high Eisenhower Administration officials who professed to be "shocked" at this "inflationary" figure. Suggestion was made that the steel companies confine their August price rise to a "modest" figure like $8.50 per ton, and defer the "second instalment" of the price rise until after the November election.)

Boom Still Looms

Boom business right through March, 1957, is the official outlook in government circles, notwithstanding the Federal Reserve Board's recent actions to discourage business firms and consumers from spending recklessly.

Period of inflationary danger, as the Board sees it, will run from October through next March. To counteract what it regarded as overly-ambitious expansion plans, the Board increased the cost of money to banks so as to make borrowers think twice before signing notes for new debt.

But the latest reports on business activity around the country show that not many expansion programs—either those of business or of individuals—are being cancelled. Most firms, it appears, are going ahead with plans for incurring new debt and are simply adding the higher interest rate to their costs with the expectation of passing it along to their customers.

As long as business remains bright, customers are not going to balk at the tilted price scales. A slump, however, could produce a flock of cancellation orders.

There was nothing in the immediate (August and September) business picture to warrant the boost in the money rates, the Reserve Board admits. But the government's money experts are casting a wary eye at the final quarter of 1956 and the first quarter of 1957. This, they declare grimly, is the "danger area."

Fairless Is Ike's Foreign Aid Legman

■ **Ben Fairless is taking a close look at the U. S. foreign aid program and will report back to the White House on what the government should do to get more for its foreign aid dollar.**

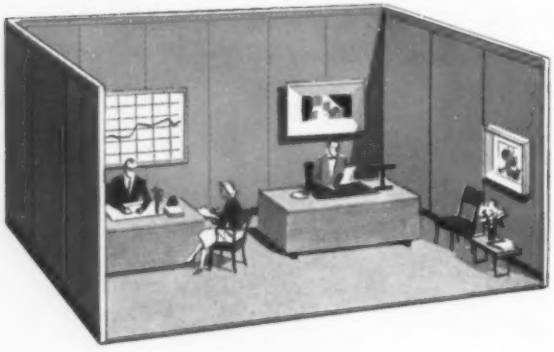
A growing number of congressmen is of the opinion that the primary emphasis in the U. S. foreign aid program should be shifted from military to civilian aid—that more friends can be gained from power plants and farm implements than guns and tanks.

Mr. Fairless, head of the American Iron and Steel Institute, says he expects to make a "complete study" of overseas aid and will recommend whatever corrections his committee believes necessary.

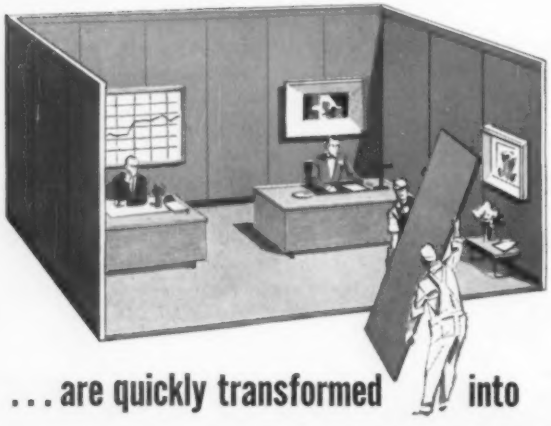
The committee, consisting of nonpartisan observers, is known as "The President's Citizens Advisers On the Mutual Security Program."

J&L SHEET STEEL ON ANOTHER *Important* JOB

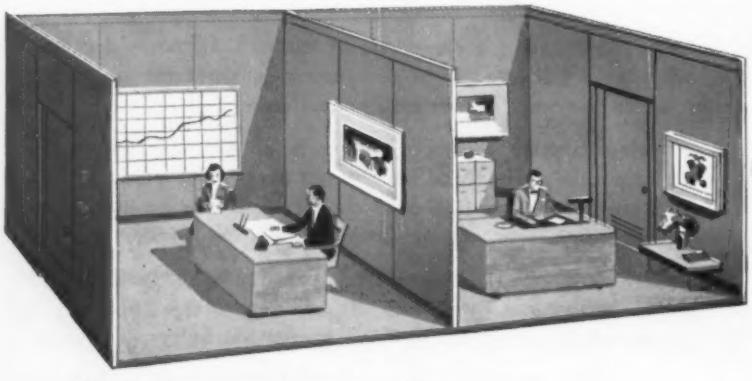
MOVABLE STEEL WALLS THAT ASSURE FLEXIBLE OFFICE LAYOUT



Crowded, inefficient general office areas



. . . are quickly transformed into



. . . efficient, private work units

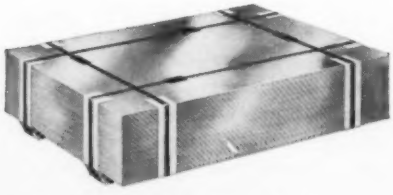
Steel interior walls, easily installed and quickly rearranged, provide business management with an efficient means of allocating expensive floor area to keep pace with changing space requirements.

Because durability is one of the requirements for the basic material of these modern, attractive partitions, J&L high-quality sheet steel enjoys a growing acceptance among manufacturers of movable interior partitions.

J&L success in meeting their demands is the result of rigid quality control during production, coupled with a thorough understanding of product end use.

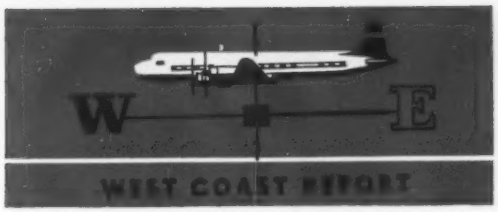
If you fabricate sheet steel, this formula for successful service can be applied to your requirements. Whatever your specifications for uniformity in workability, formability and drawing properties, you can depend on J&L sheet steel. It will help you get the best out of your production equipment and add to the value of your finished product.

Jones & Laughlin
STEEL CORPORATION · PITTSBURGH



Serving Steel Users Everywhere—
Linked by Water to the Middle West and South

J&L
STEEL



Ex-Employees Make Willing Recruits

Your former employees like you more than you may realize . . . One California firm with a big labor turnover sees possible solution to skilled labor shortage . . . Survey results are surprising—By *R. R. Kay.*

◆ ARE YOU LOSING too many workers? Want to get them back? A major company here lost 5600 of its 10,000 employees in one year. What can they do about it? Here is something to think about.

Dr. Wayne L. McNaughton of the Graduate School of Business Administration, University of California at Los Angeles, took on the job of querying ex-employees of a large West Coast manufacturer. Some questions: Why did you quit your job? Would you like to return? What did you like best about the company? What did you dislike most?

Forgive and Forget . . . Some 40 pct of the workers made "polite" excuses when they left. But to Dr. McNaughton they gave more truthful answers. "Poor pay," "bad supervision," "slow advancement," and "didn't like the work asked to do" led the chorus of replies.

A big 23 pct said they quit because of the poor quality of supervision. But only 8 pct were unhappy about their paycheck. Most startling finding: many employees would consider coming back to work—maybe the old job wasn't so bad at that. Three out of four who had quit after two months said that they still could be had. So did 57 pct of those who left after 11 months.

West Coast Briefs

Nearly half of Washington's primary aluminum production is now fabricated by the local producers. Of the 546,700 tons of aluminum made last year, 265,650 tons were further processed—a good sign of the Pacific Northwest's secondary industrial expansion.

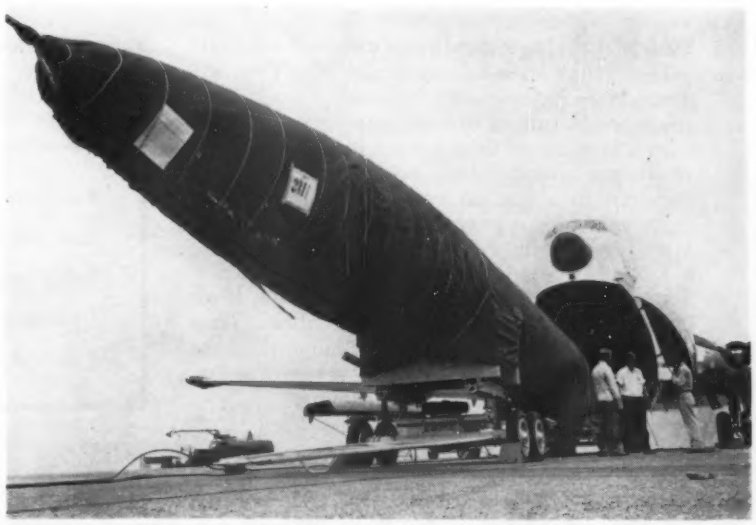
Scrap-starved Japan will be getting a record 60,000 tons during September. Six foreign flag ships will haul it there from Los Angeles Harbor. That's on top of the heavy shipments steadily going out from other West Coast ports. And Japan is also buying 50,000 tons of iron ore.

Here's welcome news for the down-in-the-dumps shipbuilding industry here. Todd Shipyards Corp., San Pedro (Los Angeles Harbor), will get a $11 million Navy contract. The work is for conversion of a Mariner-type merchant ship to an attack troop transport.

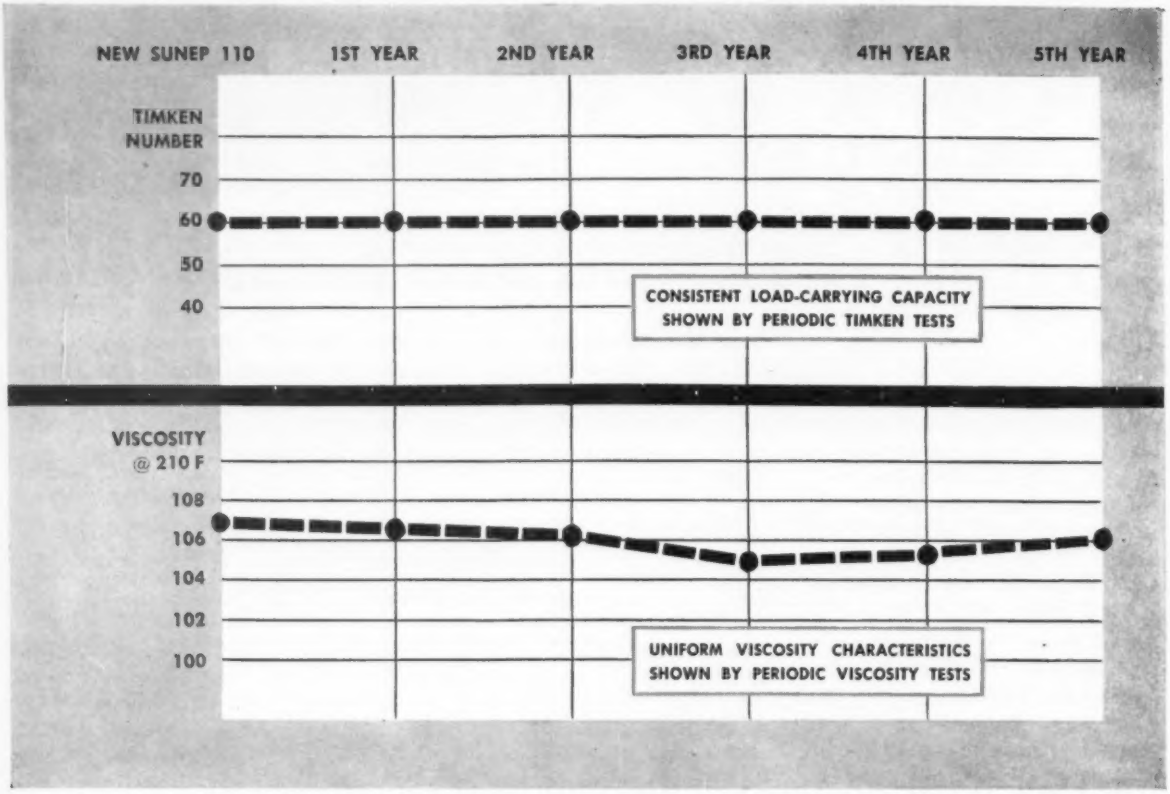
Seattle Port Commission is getting a 600 acre industrial tract lined up. The $15 million Duwamish Waterway Industrial District may be ready for tenants early 1959.

Uranium's making headway in Washington. Substantial tonnages have been developed on claims on the Spokane Indian Reservation in Stevens County.

Explosive "Cigar" With a Kick



KING SIZE STOGIE-like object being wheeled into the mouth of a C-124 transport is really a Snark SM-62 guided missile wrapped in tarpaulins. That's how the Air Force ships them from Northrup's Hawthorne, Calif., plant.



Taken from the records of a major steel producer, the above graphs show the life record of a Sunep gear lubricant used in a 3-stand, 4-high cold-rolling mill. *With no make-up,* Sunep is as good as new after running more than 30,000 hours.

Steel company tests show:

SUNEP EXTREME-PRESSURE LUBRICANT REDUCES OIL AND MAINTENANCE COSTS

Sunep® lubricants help cut over-all oil costs because they have a long service life. They are made from high-quality base oils...unusual in the manufacture of extreme-pressure lubricants ...and because of this, are outstanding in their resistance to oxidation. They will not thicken or thin out in operation and will separate easily from water. Most important, they will last years longer than ordinary gear lubricants.

Sunep lubricants help keep maintenance down because they don't lose their e.p. qualities. They are specially blended to prevent "fall-out" of the extreme-pressure ingredients in service...a frequent and hidden cause of gear failure.

Sunep lubricants protect bearings and gears against rust and corrosion...an added help in reducing maintenance costs.

For more proof that Sunep and other Sun Products can benefit you, visit Sun's booths 118, 119 and 120 at the Iron and Steel Exposition, Cleveland Public Auditorium, September 25–28.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

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SUNOCO

M-Day Program No Longer Shooting Blanks

Now it's for real . . . Pulling the trigger would start 84 machine tool builders producing 15,000 general purpose machines within the first six months . . . 21 contracts signed—*By E. J. Egan, Jr.*

◆ MUCH TALKED about M-Day Machine Tool Pool Order Program is finally a fact. Pulling the trigger on this project will automatically get 84 U. S. machine tool builders off to a running start in the event of allout mobilization.

For the first six months of any major defense emergency these builders will have only one objective: to produce 15,000 general purpose machine tools as fast as possible. The M-Day program assures builders a ready market. Plants making military end items will lay priority claim to most machines as soon as they are built. Uncle Sam guarantees to buy all those that aren't grabbed off.

Includes . . . Equipment scheduled for building in this crash program includes: boring, broaching, drilling, grinding, milling, gear cutting and finishing machines; lathes, planers and miscellaneous general purpose cutting tools; bending and forming machines; manual, mechanical, hydraulic and pneumatic presses; punching and shearing machines; forging presses and hammers; general purpose secondary metal forming and cutting machines.

If the project is ever triggered, total value of the 15,000 tools will run about $250 million. Builders who might need working capital would be able to get it from the government, up to 30 pct of the value of the items to be produced on their Pool Order contracts. Government has $21 million in Borrowing Authority funds set aside for this purpose.

Step By Step . . . The Pool Order Program was initiated by the Office of Defense Mobilization in February, 1955. First step was to ask more than 120 builders if they cared to participate. Affirmative replies came from the 84 firms presently involved.

Next step was to prepare 84 contracts that would be acceptable to both ODM and the builders. To date, 70 contracts have been submitted to builders for final approval; the remaining 14 will probably be drawn up within the next two months.

As of August 31, twenty-one builders had accepted contracts covering 5567 individual tools at a contingent cost of $68,744,000. Five more contracts are in the final acceptance stage. The 21 agreements already signed and sealed apply to builders in 12 cities over an 8-state area. Smallest contract covers 50 tools valued at $106,000, largest is for 1125 items at a total cost of $9,482,000.

THE IRON AGE

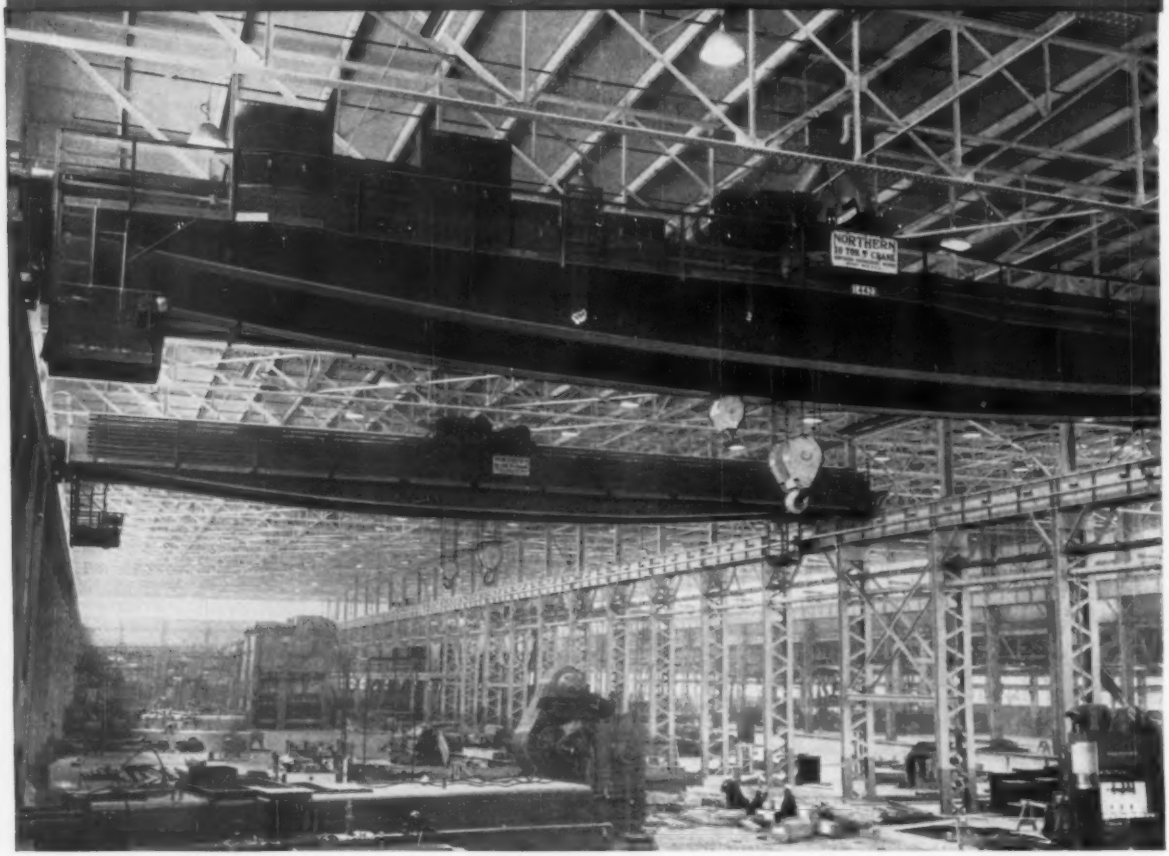
Vital . . . Contracts will remain in force until 1963. If triggered by government notice to builders, they will avoid a time lag that has been serious in past emergencies, could be disastrous in the next one. Past delays occurred because machine tools to make military end items were not ordered until after the end items were contracted for.

Meeting . . . Thirty-second Annual Meeting of the American Machine Tool Distributors' Assn. will be held October 15 and 16 at the Broadmoor Hotel, Colorado Springs, Colo. Sessions will stress the need for aggressive development and expansion of sales engineering skills to convince industry of the greater productivity and economy offered by modern machine tools.

More than 250 AMTDA members and executives of machine tool-building firms are expected to attend the two-day convention. Sales training specialist Charles B. Roth will be the keynote speaker for a program featuring a dramatized sales meeting. In still another session, a sales promotion and advertising panel will discuss ways to use these sales aids.

Panel moderator will be R. M. Skallerup of Waldie & Briggs, Inc., Chicago. Panel members will include executives of machine tool distributing and building firms.

Look Overhead··· see "NORTHERN"



these notable twins assure dependability

LOCATION — *Press bay of a large, new plant manufacturing rear axle parts and components for automobiles and trucks.*

SPAN — *96 feet 10 inches, centers of runways.*

CAPACITY — *30-tons on Main Hooks, 10-tons on auxiliary hooks.*

ELECTRICAL EQUIPMENT — *60-HP motors on Main Hoist, Auxiliary Hoist and Bridge Travel, and 15-HP motor on Trolley Travel, with full magnetic control and direct current on brakes.*

ADVANTAGES—These twin NORTHERN cranes serve twin heavy press lines located at each end of the press bay. Designed for heavy duty requirements with compensating type bridge end trucks, and equally suitable electrical equipment and controls, they dependably and safely speed machinery installation or relocation, and assure smooth, uninterrupted flow of work in today's and tomorrow's automated production.

Let us explore similar possibilities in your plant

NORTHERN MATERIAL HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS
210 CHENE ST. • DETROIT 7, MICH.

The Iron Age

SALUTES

Rex D. Cross Formerly an outstanding management consultant, his advanced ideas helped many firms through periods of distress. He was key man in revitalizing Laclede-Christy Co., which elected him vice president-general manager.

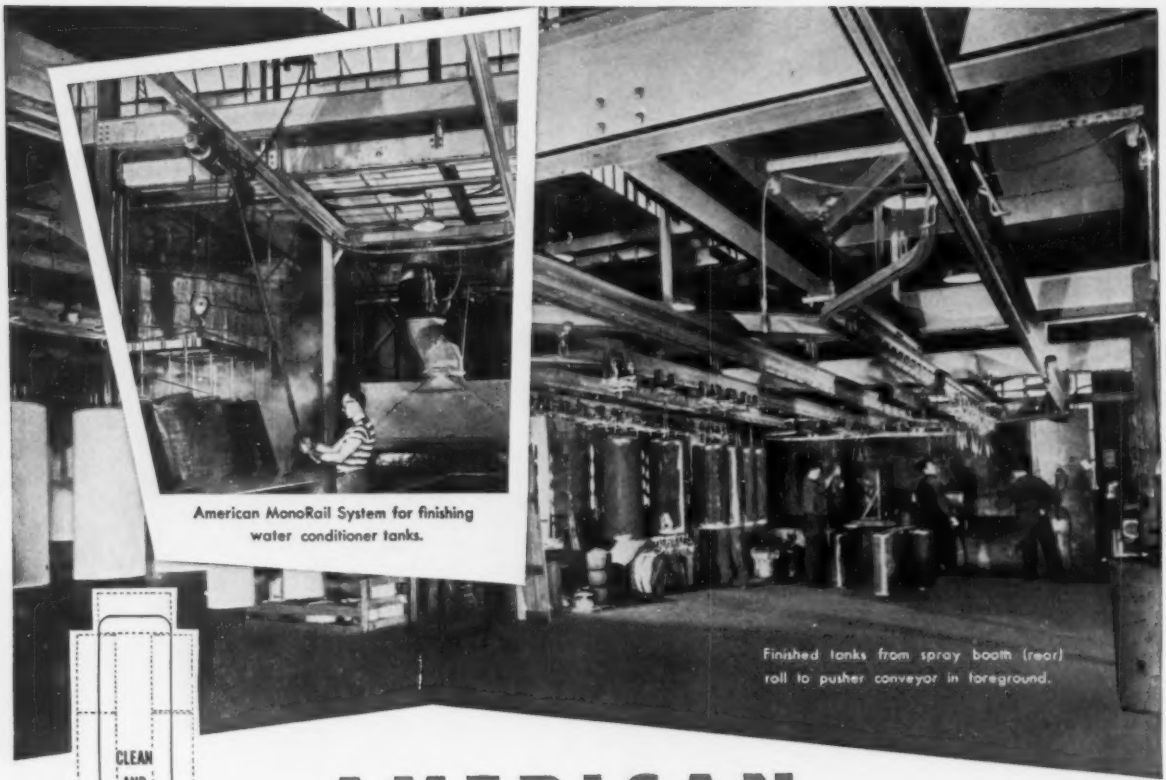
Rex D. Cross hit the refractories industry like a young tornado. When H. K. Porter Co. took over ailing Laclede-Christy Co. in 1954, staid old L-C was in dire need of young, progressive management. The parent company brought in Cross, then an outstanding management consultant, as vice president in charge of sales. Following his own recommendations to many a previous client —"Sell profitably; set a high principle and sell up to it."—within a year he revitalized the company's sagging sales curve.

Laclede-Christy didn't let Rex Cross' divers talents go to waste. In the spring of this year he was made vice president-general manager. The human tornado picked up momentum and in a few months an impressive list of changes had come over the company's St. Louis plant.

He inaugurated a highly effective safety program; installed a large air conditioned cafeteria for employees; and solved the perpetual housekeeping problem in the brick plant by replacing a broom-pushing brigade with a portable industrial vacuum cleaner and a small industrial street cleaning machine. The result was an upsurge in employee morale. He is following up with frequent visits to the shops, where he talks with workers, listens to their gripes and compliments. He started a suggestion system.

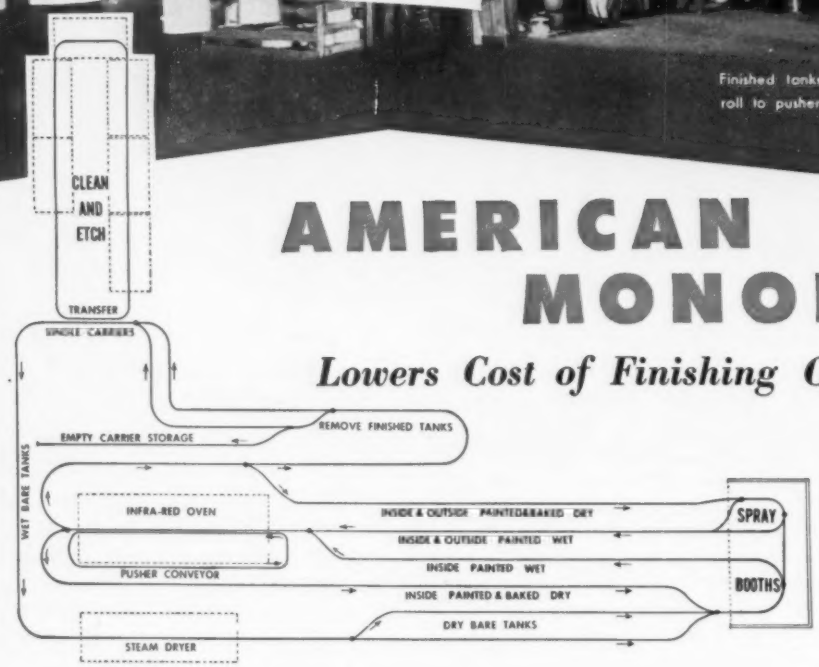
And Mr. Cross hasn't overlooked the supervisors in his drive toward an ideal of industrial perfection. Every department in the company is feeling the dynamicism of his management methods. He works at it from 60 to 100 hours a week.

When Mr. Cross was graduated from Tulane University he went directly into the Navy and served four years during World War II. Once back in civilian life, he joined the Johnston Pump Co. and became general sales manager. A few years later, his natural talent for solving sales and management problems earned him a reputation as an outstanding industrial consultant. Then he hit Laclede-Christy Co., and the refractories industry is still whirling from the impact.



American MonoRail System for finishing water conditioner tanks.

Finished tanks from spray booth (rear) roll to pusher conveyor in foreground.



AMERICAN MONORAIL

Lowers Cost of Finishing Operation

Costs are cut every step from cleaning and etching to finished tanks in this continuous operation by American MonoRail. For this manufacturer the up-and-over system of materials handling boosted production, improved space utilization, cut damages to material and improved both working conditions and production control.

If you have a materials handling problem, call your nearby American MonoRail engineer. He is qualified to help you solve it.

up and over

"Up-and-Over" is the title of our 16-mm. sound film to solve many tough handling problems at low cost. Please allow three weeks to schedule showing.

AMERICAN MONORAIL COMPANY

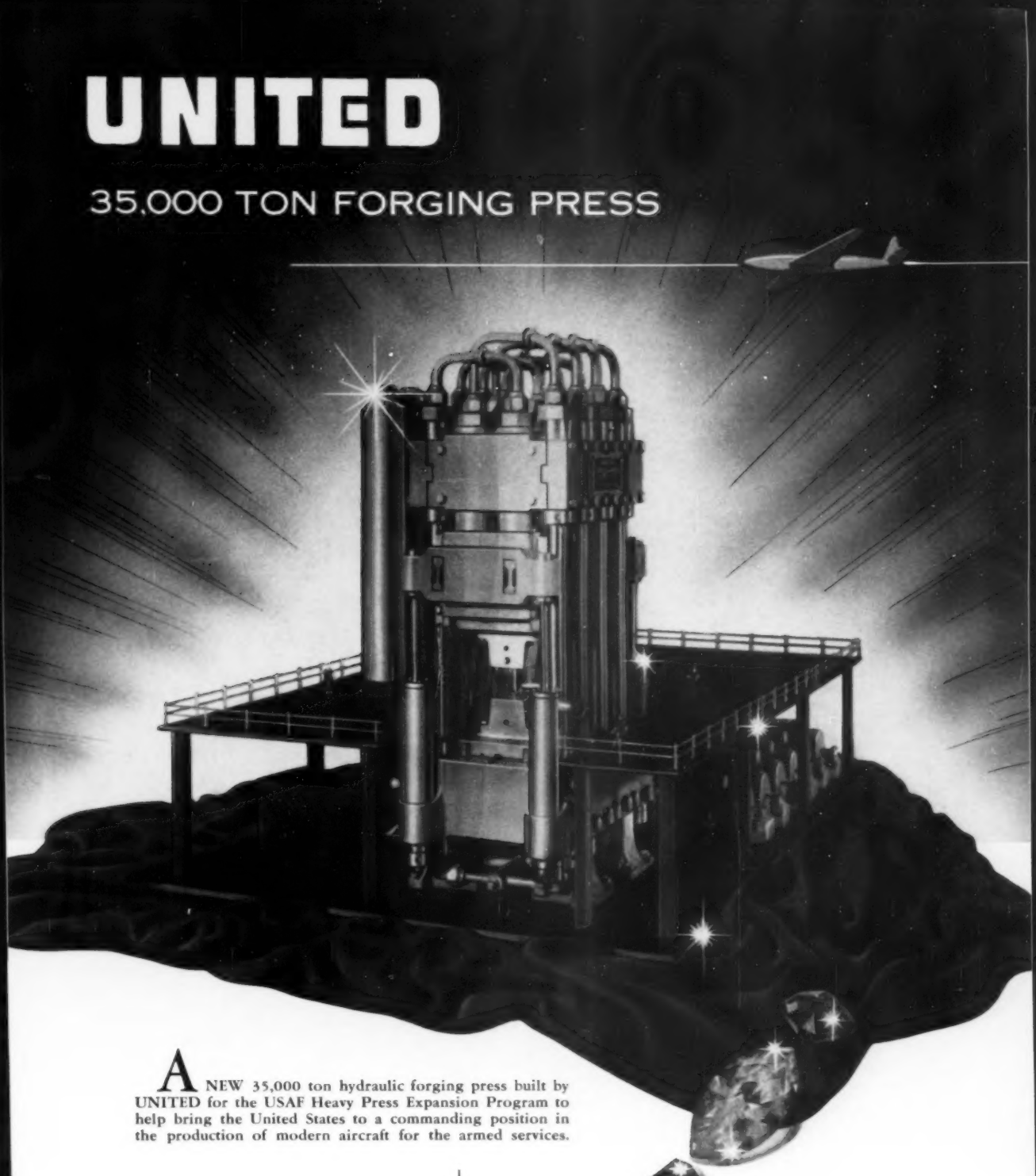
OVERHEAD HANDLING EQUIPMENT

13103 ATHENS AVENUE • CLEVELAND 7, OHIO

Member of Materials Handling Institute - MonoRail Association

UNITED

35,000 TON FORGING PRESS



A NEW 35,000 ton hydraulic forging press built by UNITED for the USAF Heavy Press Expansion Program to help bring the United States to a commanding position in the production of modern aircraft for the armed services.

UNITED

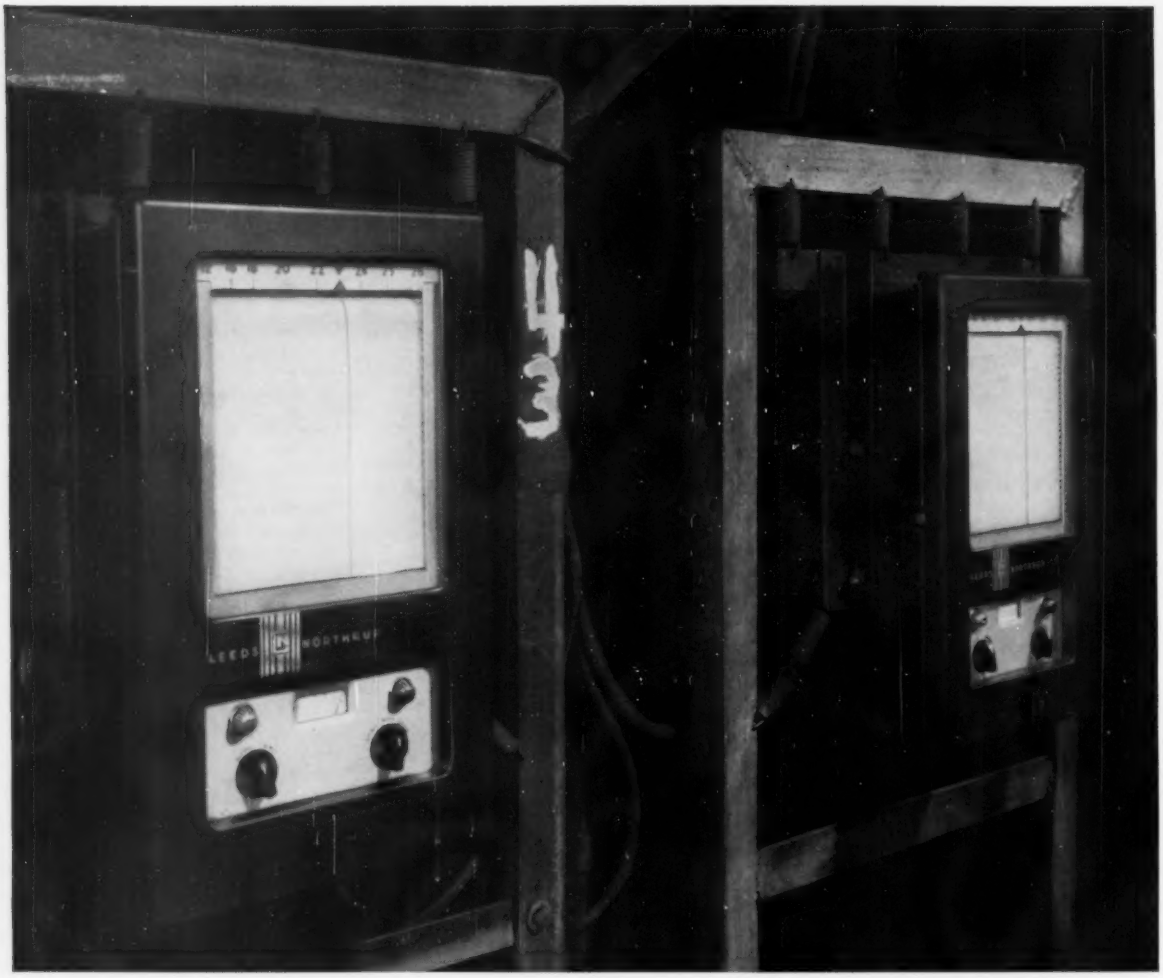
ENGINEERING AND FOUNDRY COMPANY

Pittsburgh, Pennsylvania

Plants at: Pittsburgh • Vandergrift • Youngstown • Canton
Wilmington (Lobdell United Division)

Subsidiaries: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



30 STEAM HAMMERS

can't shake Speedomax® H off control

In the heart of the Chicago steel area, Speedomax H 3-Action P.A.T. recording controllers are helping Standard Forgings Corp. turn out quality forgings which range in size from 5 lb. blanks to railroad axles weighing about ½ ton. Subjected to constant and severe vibration from 30 steam hammers and 60 presses for 24 hours a day, 5 days a week, 13 Speedomax H instruments (with five more waiting installation) have been controlling furnace temperatures for over a year with only such routine maintenance as chart changing, etc. And work temperature is held constant within ± 10 F. In both respects, this represents far better performance than the company has experienced before.

In addition to being assured of the correct temperature for each heat, Standard Forgings has also realized the following more tangible benefits since installing Speedomax H: (1) doubled refractory life, (2) reduction in scale with corresponding reduction in bottom cleaning from twice a week to once in two weeks, and (3) fuel savings of 50-75 gallons of oil per shift. Savings realized in increased furnace efficiency alone paid for the instrumentation in a short time.

Perhaps Speedomax H can help solve your temperature problems. For further information, contact your nearest L&N office or write 4956 Stenton Avenue, Philadelphia 44, Pa.

LEEDS LN NORTHRUP
Instruments — Automatic Controls • Furnaces

The Iron Age INTRODUCES

Robert J. Greenebaum, named president, **Drum and Pail Fabricating Div.,** Inland Steel Container Co., Chicago.

David Wenner, appointed vice president, **Michigan Crane and Conveyor Corp.,** Detroit.

M. L. McCorpin, elected vice president, **Union Supply Co.,** in charge of sales and store operations, Pittsburgh.

Stephen G. Basic, appointed superintendent, Production Planning Dept., **U. S. Steel Corp.,** Gary Steel Works.

Henry A. Lundy, elected vice president, **Hardinge Bros., Inc.; James P. Wagner,** appointed advertising manager.

James W. Cottrell, named recruiting manager, General Sales Div., **Reynolds Metals Co.**

J. R. Matullo, appointed branch manager, **Worthington Corp.,** New Jersey Sales office.

D. B. Reeder, appointed western manager, metallurgical service, **Electro Metallurgical Co.,** Div. of Union Carbide and Carbon Corp.; **H. J. Pfeifer,** named manager, San Francisco region.

Michael Montalbano, appointed director, computer research. **Kaiser Steel Corp.,** Oakland, Calif.

B. I. Ulinski, appointed director, development and design, **Automatic Transportation Co.,** Chicago; **Raymond E. Orton,** named manager, Product Engineering Dept.

Hugh D. Connell, named manager, Project Engineering Dept., **Acme Steel Co.,** Chicago.

Raymond E. Ward, named New England regional manager, Elevator Div., **Westinghouse Electric Corp.,** Jersey City, N. J.

Following appointments are within the Heat Transfer Apparatus Dept. of **Westinghouse Steam Div. P. L. Fetzer,** named sales manager; **M. A. Nelson,** named engineering manager; **W. E. Rudloff,** named manufacturing manager.

Roland E. Durocher, named assistant manager, Minnesota Ore Div., **Jones & Laughlin Steel Corp.,** Virginia, Minn.

James R. Bolton, named comptroller, Buick Motor Div. of **General Motors,** Flint, Mich.

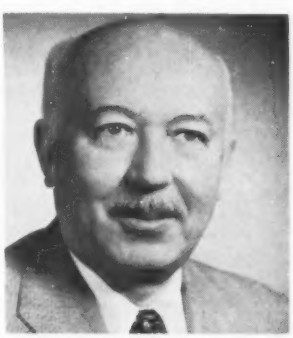
V. H. Sutherlen, named general sales manager, Oldsmobile Div., **General Motors.**

T. J. Coleman, appointed associate technical director, **Union Carbide Development Co.,** Div. of Union Carbide & Carbon Corp.

H. BACON COLLAMORE, named chairman of the board, Pittsburgh Steel Co.

RICHARD McL. HILLMAN, elected vice president and treasurer, Pittsburgh Steel Co.

JOSEPH G. SMITH, elected vice president, purchases & raw materials, Pittsburgh Steel Co.

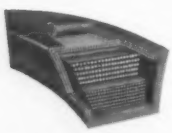


DIETRICH TIMMERMAN appointed chief engineer, Rolling Mill Dept., Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

DODGE PRODUCTS You Should Know-

AIR-GRIP CLUTCHES

TAPER-LOCK CHAIN COUPLINGS



SEALED-LIFE V-BELTS

Dodge Bulletins you should have-

- Technical data and selection tables for Air-Grip, Diamond D, Rolling Grip Clutches. Bulletin D56.
- Taper-Lock Chain Couplings. Technical data and selection methods. Bulletin A-644.
- Sealed-Life V-Belts. Data on sizes, pitch lengths and outside lengths. Bulletin A-606.

Write for your copy.

DODGE of Mishawaka, Ind.

DODGE MANUFACTURING CORPORATION
800 Union Street • Mishawaka, Indiana

Lemuel B. Hunter, named assistant to president, **Inland Steel Co.,** Chicago.

Donald E. Cummings, named manager, Steel Mill Sales Div., **Air Products, Inc.,** Allentown, Pa. **Robert B. Schultz** and **John K. Stewart,** named sales engineers, Steel Mill Sales Div.

Henry F. DeLong, appointed general manager, Cathode Ray Tube Dept., **General Electric Co.,** Syracuse, N. Y.

Clarence H. Sleeman, appointed chief mining and development engineer, Ore Mines & Quarries Div., **Jones & Laughlin Steel Corp.,** Pittsburgh.

Following appointments are within the Gas Turbine Dept., **Westinghouse Electric Corp.,** Lester, Pa., plant. **C. J. Burke,** named sales manager; **E. J. Fogel,** named manufacturing manager.

Thomas S. Teague, appointed manager, materials, Manufacturing Section, Metallurgical Products Dept., **General Electric Co.,** Detroit.

Kenneth L. Bates, appointed field engineer, **Norton Co.,** Worcester, Mass.

Dr. Gordon E. Zima, named research metallurgist, Bayonne Research Lab., **The International Nickel Co., Inc.**

James W. Perry, named industrial application enginer, Chicago district office, **Vickers, Inc.,** Detroit.

Richard R. Kesti, named chief engineer, **Valvair Corp.** and **Sinclair-Collins Valve Co.**

Robert H. Hudson, named production metallurgist, **The Timken Roller Bearing Co.'s** Gambrinus plant; **Wilbur G. Bischoff,** named metallurgical engineer, customer service work, Steel Div.; **David C. Ladd,** named metallurgical engineer, production.

NEELE E. STEARNS, elected vice president, planning and development, Inland Steel Co., Chicago.

ALLEN M. HARRELSON, named vice president and treasurer, H. K. Porter Co., Inc., Pittsburgh.

EARL R. LEWIS, JR., named production manager, Cutting Tool and Gage Divisions, Pratt & Whitney Co., Inc., West Hartford, Conn.

JOHN A. LINDBERG, named manager, manufacturing operations, Mackintosh-Hemphill Div. of E. W. Bliss Co. Pittsburah, Pa.

throughout industry—today's job records prove

modern

High Speed Steels

-correctly applied-

show lowest costs

per cu. in. of metal removed

Today's High Speed Steels keep pace steadily with the ever-higher production requirements of American industry. Improvement in quality and advances in heat-treating techniques combine to produce High Speed Steels cutting at speeds 15 to 100% faster than ever before—lasting longer between grinds than ever before!

> *Tougher* than carbides, modern High Speed Steels are *stronger* than carbides, less subject to breakage or edge chipping, *and cost less* than carbides.

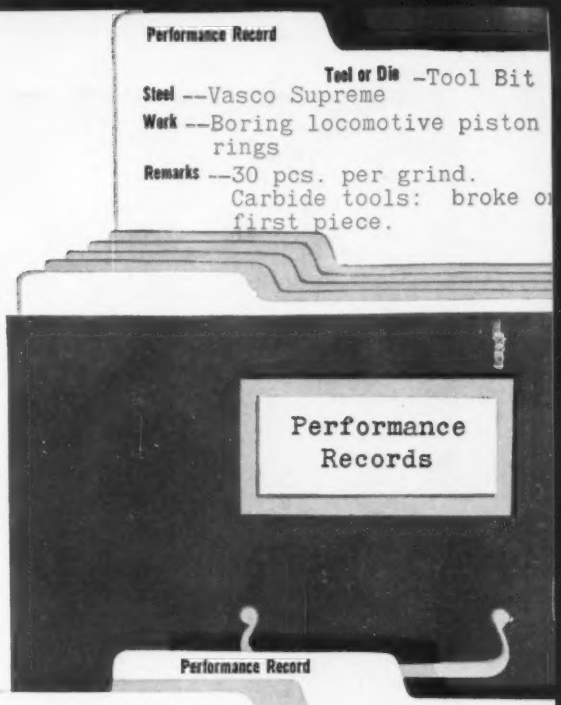
We invite you to join the majority of up-to-date users of cutting tools who specify modern High Speed Steels for 90% of their jobs *and profit* accordingly. Write us for a complete, objective survey of your cutting problems by trained sales engineers.

Vanadium-Alloys Steel Company

Pioneers in the development of M-2 High Speed Steel and High Carbon, High Vanadium High Speed Steels

Latrobe, Pennsylvania

SUBSIDIARIES: Colonial Steel Co. • Anchor Drawn Steel Co. • Pittsburgh Tool Steel Wire Co. • Vanadium-Alloys Steel Canada Limited • Vanadium-Alloys Steel Societa Italiana Per Azioni



Performance Record

Tool or Die –Tool Bit
Steel ––Vasco Supreme
Work ––Boring locomotive piston rings
Remarks ––30 pcs. per grind. Carbide tools: broke o first piece.

Performance Record

Performance Record

Tool or Die ––Rough Facing Tool
Steel ––Vasco Supreme
Work ––Rough & finish facing cast connecting rods.
Remarks ––28 pcs. per grind, 150 pcs. per tool.Carbide, 8 pcs. before breaking.

Performance Record

Performance Record

Performance Record

Steel ––Neatro **Tool or Die** ––Core Die
Work ––Molding iron powders
Remarks ––Replaced carbide on basis of cost and performance.

Performance Record

Performance Record

Steel ––Vasco Supreme **Tool or Die** ––Lamination Die
Work ––Blanking .025" sheet
Remarks ––230,000 pcs. per grind: 10,000,000 pcs. per die. Carbide: die broke at 33000 pcs.; another at 550,000 pcs.

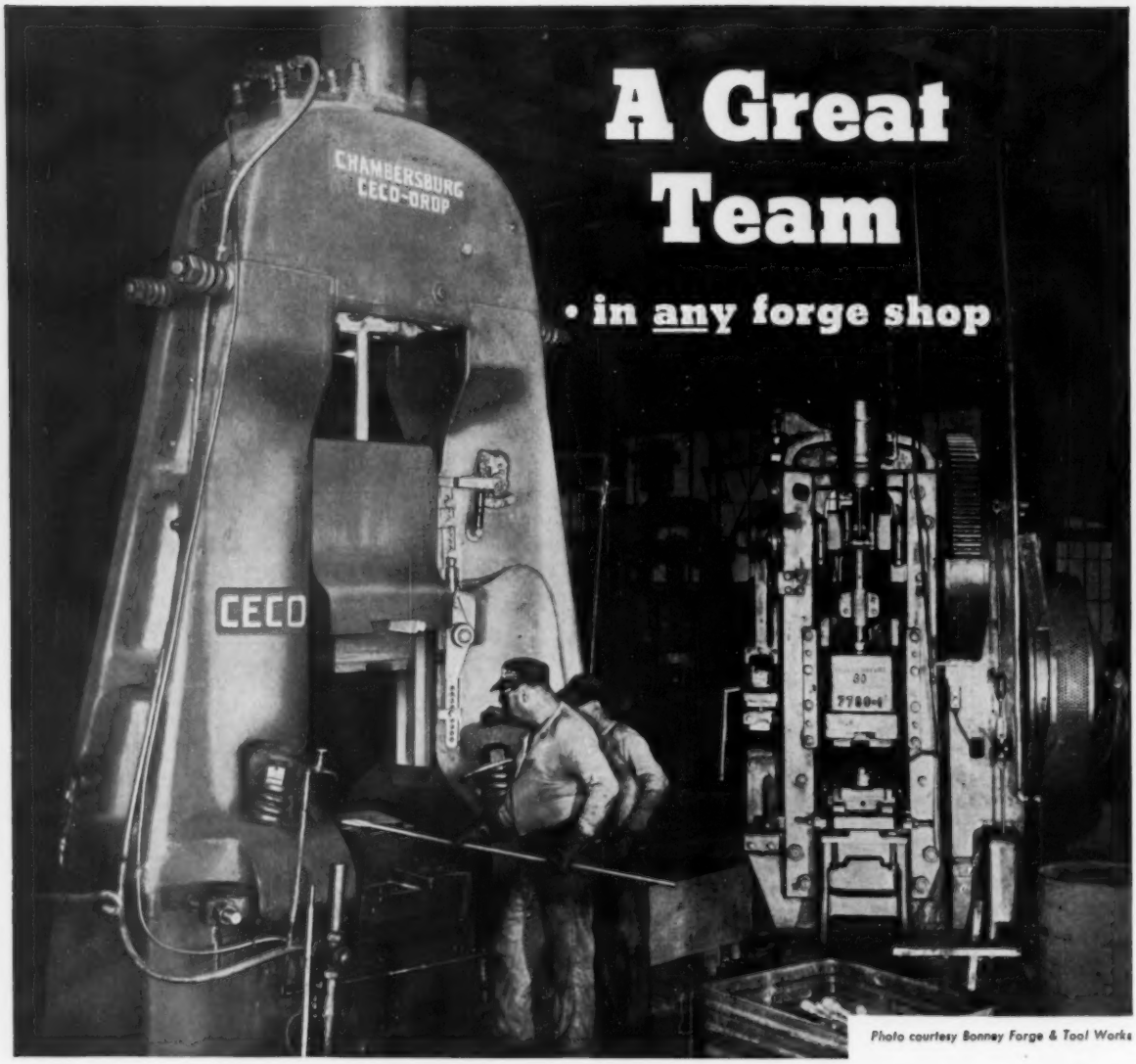
Steel ––Vasco Supreme **Tool or Die** ––Scalping Die
Work ––Removing surface of brass, bronze and copper tubing
Remarks ––199,000 ft of tubing and still in good condition. Carbide: broke at 141,000 ft.

Performance Record

Steel ––Vasco Supreme **Tool or Die** ––Tool Bit
Work ––Turning cold rolled C-115
Remarks ––Produced twice as many pieces per tool as carbide tools, at rate of 3600 pcs. per day.

Performance Record

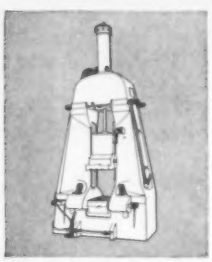
Steel ––Red Cut Superior **Tool or Die** ––Form Cutter
Work ––Form cutting bearing races
Remarks ––1st day of test: Vasco Supreme 157 pcs.; Red Cut Superior 100 pcs.; carbide 35 pcs. 2nd day: Vasco Supreme 193 pcs.; Red Cut Superior 126 pcs.; carbide 35 pcs.



A Great Team

• in any forge shop

Photo courtesy Bonney Forge & Tool Works



CHAMBERSBURG CECO-DROP

- Piston-lift • Gravity drop
- Costs less to operate
- Forges more minutes per hour
- Forgings made faster
- Operation is easier and safer
- Maintenance is cheaper
- Full stroke or short stroke without interruption
- Over 400 in service in over 100 forge shops

Ceco-Drop and Trimmer

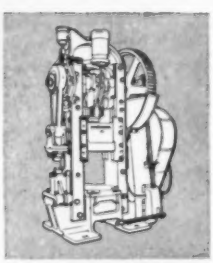
• • *for top production*

When the chips are down, it is continuous, trouble-free, quality production that puts you ahead of competition. That fact explains why the Ceco-Drop (in combination with the "indestructible" Chambersburg Trimmer) has become in nine short years, the standard gravity drop hammer of the forging industry.

Write for descriptive Bulletins

CHAMBERSBURG ENGINEERING COMPANY
CHAMBERSBURG PENNSYLVANIA

ALSO BUILDERS OF THE IMPACTER



CHAMBERSBURG FORGED STEEL SLIDE TRIMMING PRESS

- Exceptional strength
- Jam-proof. Functions perfectly after stall-test
- Uses minimum floor space
- Accessible front and back
- Friction-slip Flywheel
- Interlocking forged steel side construction
- Low power consumption
- Safe
- Single or Double Crank

COLD FACTS about the HOTTEST IDEA in the history of coolants...

1. **CIMCOOL**° Concentrate has become, in just a few years, the largest selling chemical cutting fluid in the world.
2. **CIMCOOL LOWERS COSTS** because it's longer lasting in machines. Thus, it reduces downtime and cuts labor costs for cleaning and changing.
3. **CIMCOOL DOES A BETTER JOB** because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.
4. **CIMCOOL IS CLEAN,** doesn't soil hands or clothing. It contains no skin irritants. It leaves no slippery film on shoes, floors, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

For complete details on all the advantages of CIMCOOL Standard Concentrate, consult your CIMCOOL distributor. He'll be happy to tell you all about CIMCOOL—as well as the entire family of CIMCOOL Cutting Fluids. Or contact us direct and we'll send one of our Cincinnati Milling-trained machinists to call on you—without cost or obligation. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Mark Reg. U.S. Pat. Off.

CIMCOOL CUTTING FLUIDS

- CIMCOOL **Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.
- CIMCOOL **Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.
- CIMPLUS The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.
- CIMCUT **Base Additive**—For jobs requiring an oil-base cutting fluid. Added to mineral oils, it gives an economical mix for higher speeds and feeds.
- CIMCOOL **Bactericide** — The most effective agent yet developed to overcome rancidity and foul odors.
- CIMCOOL **Machine Cleaner** — The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

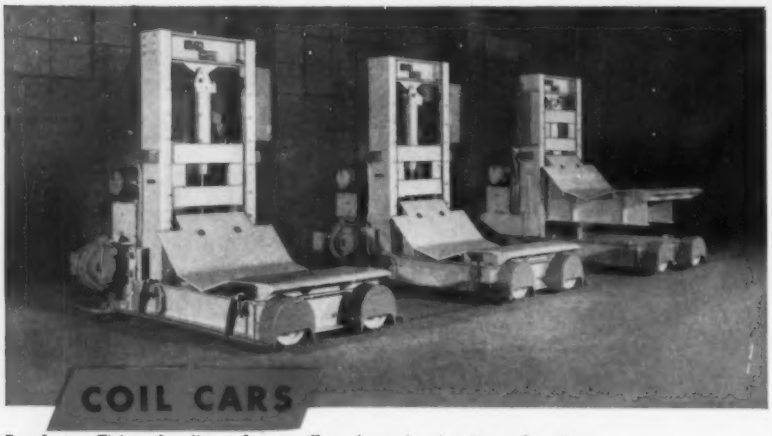
CIMCOOL Cutting Fluids

for 100% of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

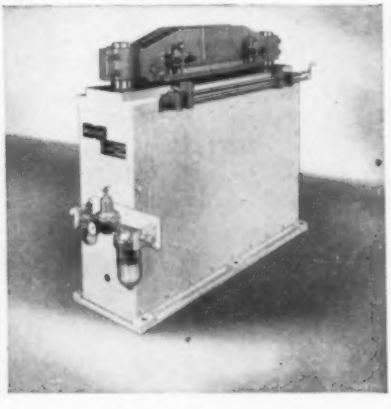
HERR EQUIPMENT

"Complete Processing and Handling Equipment . . . for any Ferrous or Non-Ferrous Material . . . That Starts — or Ends — as a Coil"



COIL CARS

For fast, efficient loading of pay-off reels and unloading of coiling reels. Sizes to handle coils of any diameter, width or weight. Hydraulic lift, electric traverse. No pits. Can be fitted with coil ejector, up-ender and other accessories if desired. Furnished complete ready for use.



SHEARS

Fast acting single shears for use with hump tables in cut-to-length and press feed lines, and other applications to square crop the end of a coil. Also twin cut shears that remove the section where two coils were stitched or welded together for continuous processing.

Write for fully descriptive Bulletin No. 561 today!

THE HERR EQUIPMENT CORPORATION

1260 VINE STREET • WARREN, OHIO

CLEVELAND, INDIANAPOLIS AND BERKELEY, CALIFORNIA

PERSONNEL

Harold Ford, appointed district sales manager, **L. B. Foster Co.,** Atlanta office; **Ronald W. Gee,** named office supervisor.

Gerhard Reethof, named chief of research, Research & Development Dept., **Vickers Inc.,** Detroit; **LeRoy D. Taylor,** named assistant chief engineer, development.

Clifford B. Bronson, named engineering consultant, New York office, **L. B. Foster Co.**

C. C. Franck, appointed consulting engineer, Steam Div., **Westinghouse Electric Co.**

Roy L. Bowers, named staff engineer, AC Spark Plug Div., **General Motors.**

Anthony D. Zar, appointed sales representative, Milwaukee district sales office, Tubular Products Div., **The Babcock & Wilcox Co.,** Beaver Falls, Pa.; **Kenneth W. Harris,** named manager, general sales office, Milwaukee.

Following appointments are within the Operations Div. of **Wheeling Steel Corp.,** Wheeling W. Va. **Howard D. Foster,** named engineer of standards; **Harry A. Lloyd,** named assistant superintendent, shipping; **Thomas W. Barnes,** named warehouse general foreman, Martins Ferry factory.

Maurice M. Muse, appointed district sales representative, Leschen Wire Rope Div., **H. K. Porter Co., Inc.,** St. Louis, Mo.

Andrew B. Huntington, named chief engineer, **Ross Operating Valve Co.,** Detroit.

E. M. Estes, named chief engineer, Pontiac Motor Div., **General Motors,** Pontiac, Mich.

OBITUARIES

M. J. Rice, 54, vice president, General Products Div., **Whiting Corp.,** Harvey, Ill.

Steelmasters for 130 years

IRON PRODUCTS
"Swede" Pig Iron

STEEL PRODUCTS
Plates (sheared)
A. W. Dynalloy (high strength steel)
Hot Rolled Sheets
Hot Rolled Strip
Cold Rolled Sheets
Cold Rolled Strip

ROLLED STEEL FLOOR PLATE
A. W. Algrip abrasive
A. W. Super-Diamond pattern

A. W. CUT NAILS
Standard & Hardened

MINE PRODUCTS
Iron Ore Concentrates
Iron Powder
Crushed Stone
Grit
Sand & Engine Sand

COKE
Foundry, Industrial & Metallurgical

COAL CHEMICALS
Ammonium Sulphate
Benzol
Toluol
Xylol
Naphthalene
Sodium Phenolate
Tar Bases (Pyridene)
Solvent Naphtha
Crude Still Residue

PENCO METAL PRODUCTS DIVISION
Steel Cabinets, Lockers & Shelving

customers...

Keeping customers, large and small . . . getting new customers and serving them—these sum up a substantial part of Alan Wood's success story. Alan Wood Steel does it through product dependability, service, competitive spirit and pioneering courage. As customer and industry needs change, Alan Wood keeps pace—or sets pace, as in the development of new or improved products. Behind it all is a guiding policy of planned growth that has helped Alan Wood Steel expand from a tiny shop in 1826 to a versatile, fully integrated steel mill that still provides individualized service and attention to its customers.

For detailed information on any Alan Wood Product, write Marketing Division—Department AW-47.

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

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DOVER, N.J.
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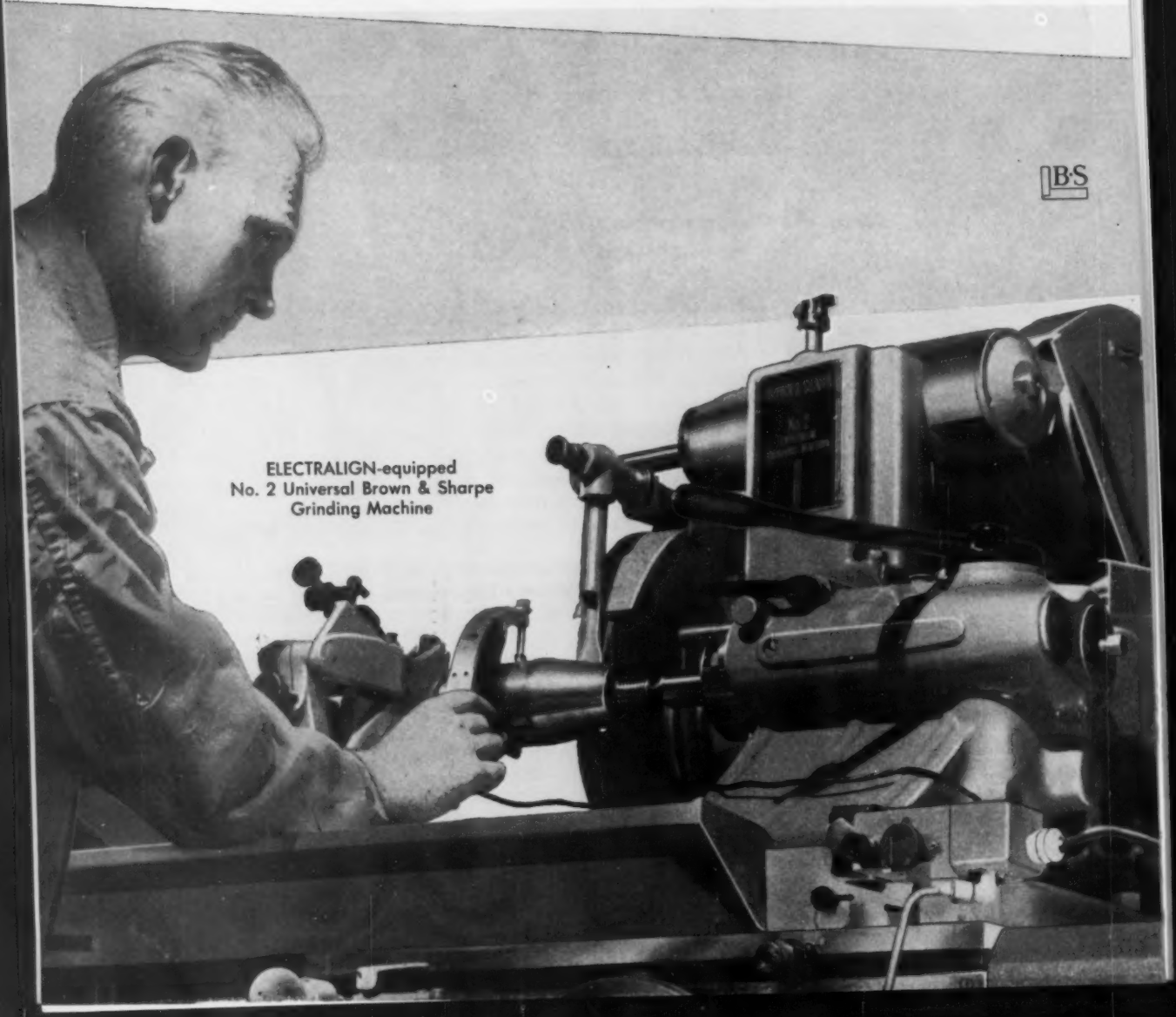
Save 60% set-up time!

with ELECTRALIGN GRINDING



ELECTRALIGN-equipped
No. 2 Universal Brown & Sharpe
Grinding Machine

repeat size to tenths!

Brown & Sharpe

Here's the simplest, quickest way to consistently grind straight and parallel cylindrical work or exact tapers to tenths or less. ELECTRALIGN-equipped Brown & Sharpe Grinding Machines actually save more than 60% swivel table set-up time!

ELECTRALIGN® provides instant alignment to 0.0001" after only one preliminary grind . . . without calculations. Operator merely sets dial to working length of piece and adjusts pointer to show taper error. Then he swivels table until pointer reads zero, and grinds to finish . . . with practically full tolerance for sizing! And size control to 0.0001" is a cinch with ELECTRALIGN's precision electronic caliper. Operator can easily measure pieces to 0.00001" . . . often right in the machine!

ELECTRALIGN GRINDING speeds set-ups, steps up productivity, minimizes spoilage — radically reduces costs in tool-room and production work. Write for complete details. Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.

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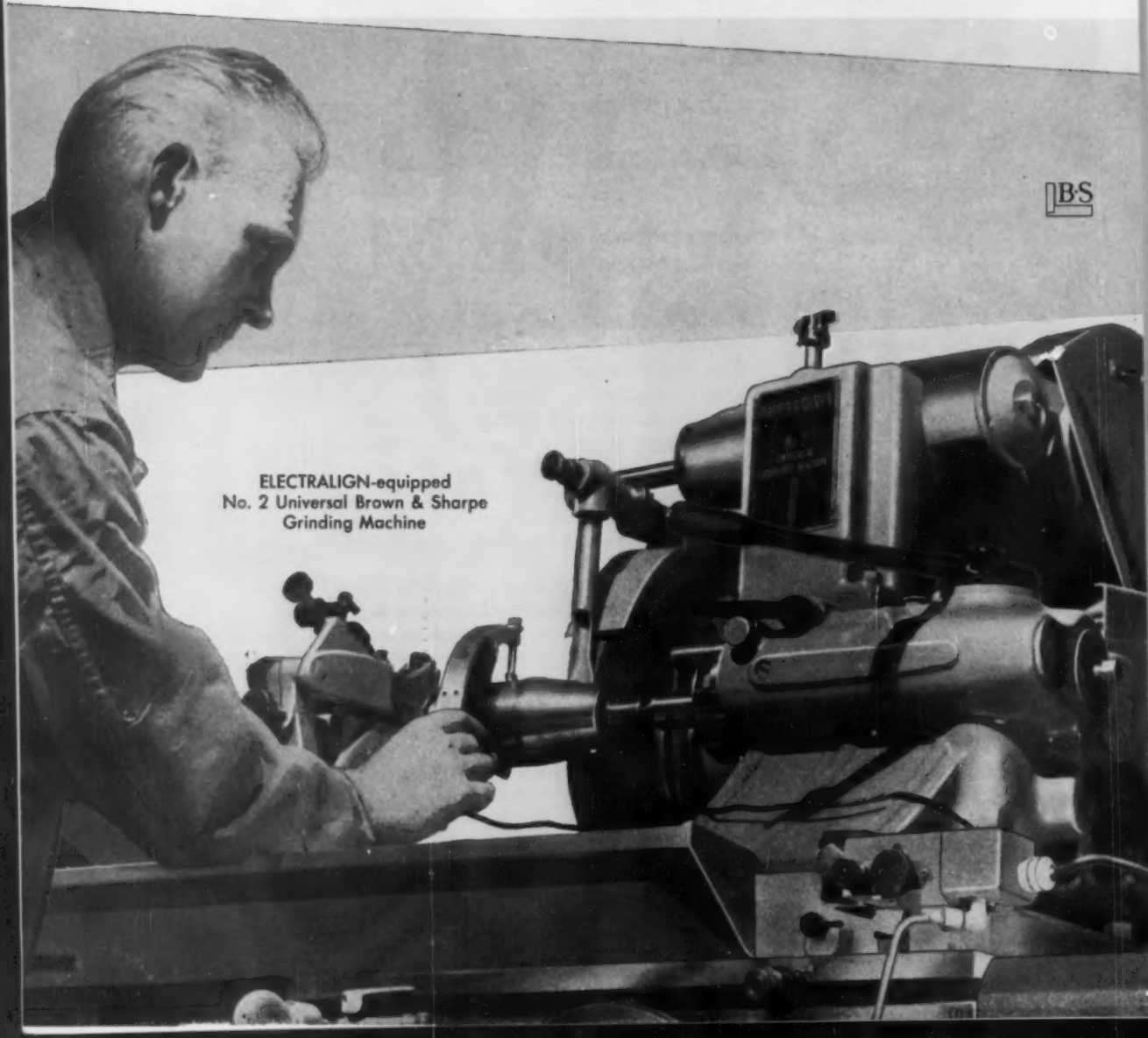

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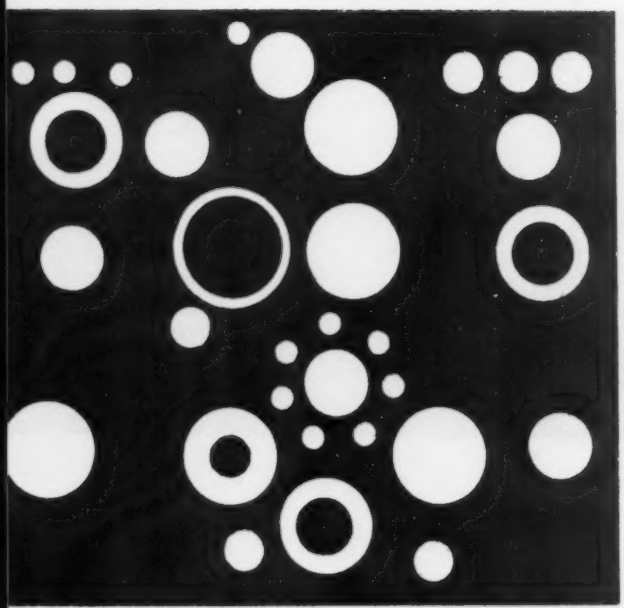
FEATURE ARTICLES



Offer production bonuses—

Stampings: The Case for Precision Carbide Dies

◆ Carbide dies, machined to gage-like accuracy, solve many a knotty cost or production problem in stamping and forming shops . . . Switch to these long-wearing dies usually means a better product made at a lower cost per piece.

◆ Carbide dies offer other benefits, too . . . They minimize press downtime, resist damaging effects of misfeeds and other press aberrations . . . These dies cost more initially, but they offer long-run economy for precision, quality work.

By W. G. PATTON, Engineering Editor

◆ IF YOU HAVE too much downtime in your press shop, precision-built tungsten carbide dies may be your best approach to improved product quality and lower cost per piece.

If your dies wear out too rapidly, or if you have too many presses doing the same job, it may pay you to look into carbide dies.

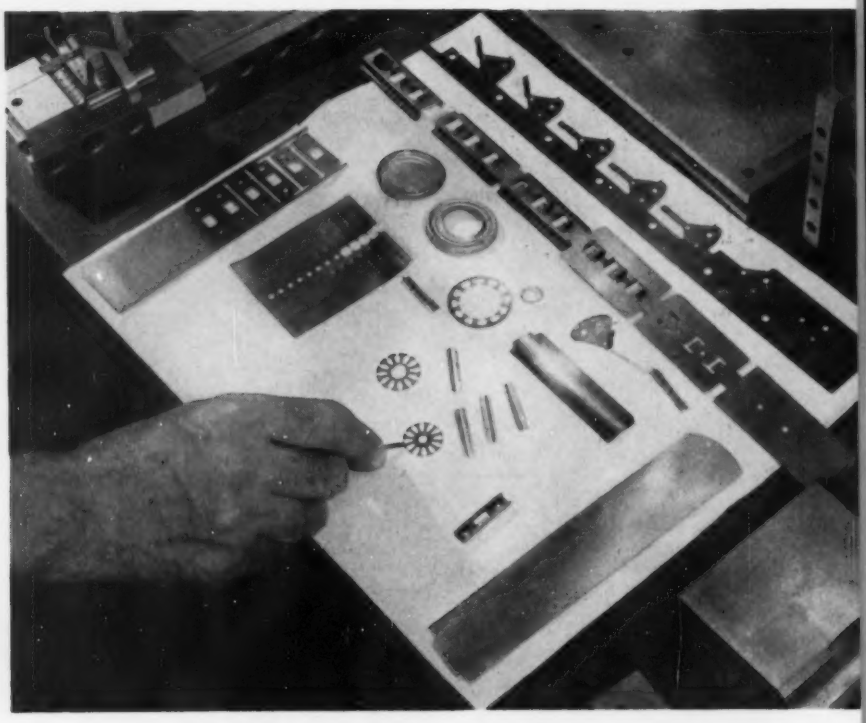
If press maintenance expense runs far ahead of your budget, carbide dies may be a good bet for you, too.

If you want more production without too much increase in investment, you may find carbide dies to be the means to that end.

If you spend a lot of money to straighten stamped parts that have to be heat treated, you may find it will save money to heat treat the strip and then stamp the part with carbide dies.

Critical stampings are now being produced in carbide dies from strip previously heat treated in the range of 40 to 50 Rc. Savings—in straightening expense, reduced press downtime, improved part quality, and useful die life up to 10 times that of steel dies—more than pay for the higher initial cost of carbide dies.

Using careful design and precision machining techniques heretofore reserved almost exclusively for gages, firms like Eglinton Carbide Products, Inc., Wyandotte, Mich., turn out car-



TYPICAL parts made on carbide dies are coded in the sketch (opposite page) for quick identification.

bide dies for an expanding range of products. Many of the products are high-volume, long-run items. But there may be conditions—ability to stamp precision parts out of beryllium copper, stainless steel or heat treated materials are examples—where carbide dies are justified even for comparatively short runs.

There are a number of widely held opinions in industry that do not describe accurately either the competitive position or the true capabilities of carbide dies. For example:

1. *"Carbide dies cost 3 to 5 times as much as a comparable steel die. We can't afford carbide tooling."* The fact is: Where steel dies are built to the same accuracy as carbide dies, the cost ratio will be closer to 2 to 1. And the life of the carbide die may be 20 to 60 times that of the low priced steel die.

2. *"We can't justify the initial tooling cost of carbide dies."* The fact is: Reduced press downtime, lower die maintenance expense, increased production and improved product quality may well justify the higher first cost of carbide dies.

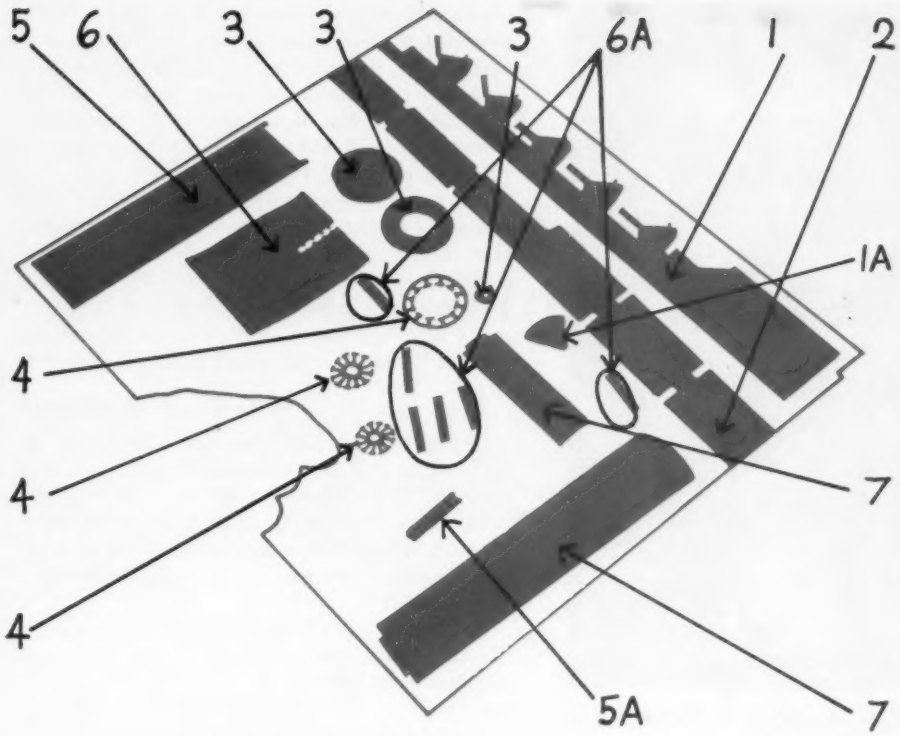
3. *"Our presses will not permit the use of carbide dies."* The fact is: Presses that are not in good condition may result in excessive downtime and high maintenance expense regardless of the dies that are used. This fact, too, should be emphasized: carbide dies built to the highest standards of precision are surprisingly resistant to damage due to misfeeds and press

TRYING out a carbide die to pierce 148 slots in electric shaver heads at 250 strokes per min.

failures that occur from time to time.

Other bonuses from carbide dies are not so well known. For example, die pickup from materials like stainless steel is entirely eliminated. And exceptional uniformity in the product is the usual result of the long-lasting, sharp cutting edges carbide provides. Accuracies within 0.0005 in. are often achieved on presses that run 24 hours per day, 7 days a week.

You don't get production bonuses like this for nothing, of course. It costs extra money—



1. Tempered spring steel strip is pierced, blanked and bent to form aperture control part for a camera (1A).

2. Ties for toy train tracks come from this progressive strip.

3. Thermostat control disks of beryllium copper.

4. Electric motor laminations made from a high nickel alloy.

5. Progressive operations on this strip result in an electric shaver part (5A).

6. Stainless steel 0.002 in. thick is pierced, marked, formed and cut off to produce disposable blood lancets (6A).

7. Carbide dies cut off these jet engine stator blades to proper size.

initially—to machine carbide die components to virtual gage accuracy. George Eglinton of Eglinton Carbide emphasizes this but also points out that such accuracy pays off in many ways: better parts, fewer interruptions to change dies, reduced scrap, easier assembly, higher production per square foot of floor space and reduced maintenance expense.

Eglinton also emphasizes that precision-built carbide dies (1) prevent misruns, (2) resist damage. Accurately built, well-supported carbide dies are strong. The various components support each other as a unit. Die strength has been proved in a number of instances where damage due to misfeeding of stock was limited to the press itself.

Economy not appreciated

Eglinton believes many press shops pay out large sums each year because the economy of using accurately-built dies is not appreciated. His argument boils down to this: some shops may be using twice as many people as they need to maintain their dies. When dies are not accurately built, these shops are also liable to high scrap loss and maximum damage from press breakdowns and misfeeds.

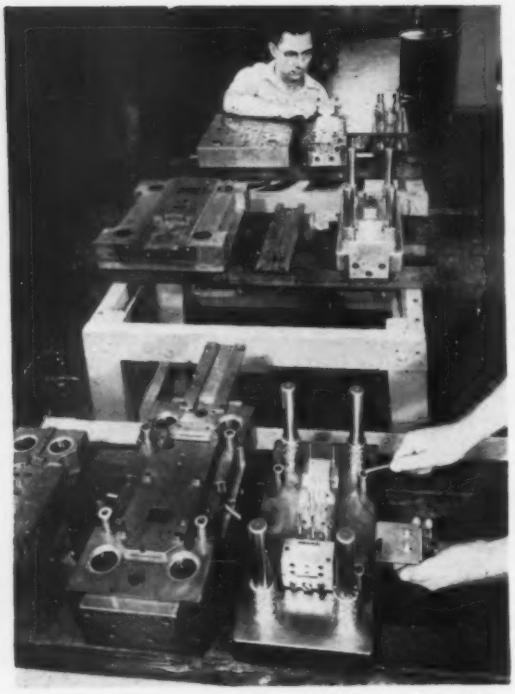
Most press shops, he also maintains, have only limited ability to run off-quality strip material. But hard spots or scale usually mean little where carbide dies are used. When steel

MANY carbide die makers have gage-building experience, are familiar with precision tools.

is short, this advantage may be quite significant.

Probably the most substantial dividends from carbide dies comes from their ability to run for long, uninterrupted periods—up to a week on a three-shift basis. This is often the case even though the material they work on has poor punchability.

Another advantage of carbide dies in good condition is that burrs are, for all practical purposes, eliminated. Carbide produces a clean,



SKILLED workers are responsible for final assembly of this group of precision carbide dies.

sharp break in the material. As an example, edge finish on a part made from very hard material was measured to be 13 to 16 microinches. Before carbide dies were used on this job, a 50 microinch finish was not unusual. Naturally, edge finish depends on many factors, including the material, condition of the dies, press speeds and others.

In another case, a blanking operation on semi-finished steel stock, steel dies gave 20,000 to 40,000 strokes per grind. With unfinished steel stock, carbide dies give 100,000 to 300,000 strokes before producing a 0.002-0.003 in. burr.

Applications are many

Just a few years ago, carbide dies found their widest use in the production of electric motor laminations. Today the list of applications is long and impressive.

For example, carbide dies require minimum servicing in the production of intricately shaped blood lancets from 0.002 in. thick stainless steel strip. Initial run on this job was 20 million pieces. Dies show no pickup and the need for passivation has been eliminated. Die-life and press efficiency are excellent.

Carbide dies are also used today for critical jet engine parts. Jet vanes, for example, are cut off accurately at high production rates from stock 3/16 in. thick.

Still another current example is a film spool bracket for a volume produced camera. A steel die on this application produced only 10,000 pieces between sharpenings and only 8 to 10 sharpenings were possible. The initial run of a carbide die produced over 500,000 pieces in a progressive operation involving piercing, blanking and forming. The carbide die reportedly shows no significant signs of wear but has already outproduced 10 steel dies.

In another shop the spring for a razor blade dispenser is made out of steel strip heat treated to 45 Rc. Springs are made two at a time in a 4-station carbide die. Operations include pierce, pilot, trim and cutoff. The part is held flat within 0.003 in. This requirement would be difficult to meet if heat treatment had to follow forming.

Make shaver laminations

Progressive carbide dies are also used to make rotor and stator laminations for electric shavers. The laminations are cut from 0.014 in. thick silicon steel strip in 4 or 5-station dies.

You may ask: "How does one get started with carbide dies?" Consensus of authoritative advice is this:

1. Check all applications where size of part, length of run, die maintenance and accuracy requirements indicate that carbide dies might be practical. Carbide should definitely be considered whenever one or more presses are working on one part, or whenever two or more identical dies are needed.

2. Start with the simple jobs. Move into the tough jobs after you have carbide experience. One business machine producer has followed this policy to cut costs substantially. By gradually accumulating knowledge, the firm has had no failures and is now using carbide successfully in applications that were not apparent in the beginning.

3. Before you start using carbide, train your die maintenance men thoroughly. Your die maker will help you with this problem but you will have to put in considerable effort yourself.

Probably the most important lesson to learn is that high accuracy in carbide dies pays big dividends in the long run. It may be difficult for even an experienced diemaker to understand why "gage accuracy" is required in a carbide die. But it is important that adjoining details and mating parts of progressive carbide dies should be lapped to fit each other perfectly.

Carbide dies now contain as many as 14 stations. Numerous safety measures protect the dies against damage. Use of air blasts and positive knockout pins is widespread. Punches and guides are solidly mounted.

Jig boring and jig grinding is invariably required to maintain the accuracies required for these new high production tools.

■ *Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept.,* THE IRON AGE, *Chestnut & 56th Sts., Philadelphia 39, Pa.*

Cooperation counts most—

How to Take a Machine Shop Time Study

◆ Accurate, fair work standards stem from intelligent time study observations . . . In turn, good time studies should be preceded by a careful job breakdown . . . Fortunately, machine shop operations generally fit rather well into specific work elements.

◆ But honest standards depend on a number of less clearly defined factors as well . . . This article lists them all, tells why and where they enter the picture, shows how to blend them into a successful overall study.

By R. A. RATNER, Asst. Prof. of Mechanical Engineering,
University of Wisconsin
Madison, Wis.

◆ OBJECT of a machine shop time study should be to set honest, accurate work standards that will be fair to both management and labor. Despite some opinion to the contrary, most firms try to meet this requirement; they know that unfair standards create hard feelings among employees and do more harm than good.

A successful standard might be defined loosely as one that permits a worker with normal skill and ability to earn his full pay without undue strain or pressure. It shouldn't be so high that a worker can't meet it without racing madly through the day, nor so low that he can loaf on the job and still meet it.

First step toward a fair standard is the collection of information. A competent time study observer needs to know as much about the job as he can before he begins his study, including: (1) the present standard, if any, and reasons for setting a new one; (2) a detailed description (including serial numbers) of the machine and any attachments used to do the job; (3) raw material specifications; (4) a complete description of the operation; (5) a sketch of the part with all operations indicated; (6) a dimensioned sketch of the work area; (7) specifications of all jigs and fixtures used.

After noting these things, the observer should break the job down into well defined and measurable work elements with definite starting and stopping points. A typical element might be "pick up part and place in holder," or "tighten chuck and lay down wrench."

As a rule, end points are indicated by a sound —the clank of a wrench as it is laid aside, the start of a motor, or a change of direction or motion.

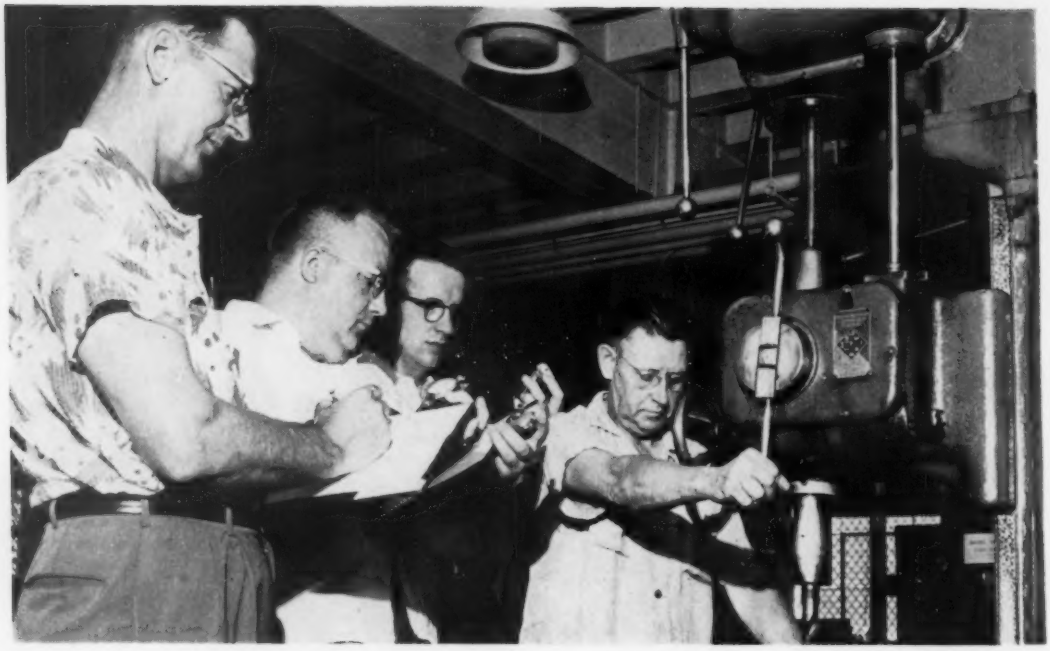
Whenever possible, elements should be consistent from study to study so that logical comparisons can be made. For example, if one observer uses an element such as "pick up part and place in jig," and another uses "pick up part, place in jig and tighten clamps," it is difficult to compare element times with any degree of accuracy.

Should note speeds and feeds

Job breakdown should also note all speeds and feeds as well as elapsed times of machining cycles. In addition, everything the worker does on the job should be listed, such as stacking parts, changing tools, removing chips, or otherwise cleaning the machine.

An accurate breakdown is not only essential to a fair time study. It can also be useful as a detailed record of the job method. Thus if the same operation must be set up again later, it can be done quickly and with some basis for setting the standard.

Actual time studies begin after the job break-



FOR consistent standards, train all time study observers to use the same methods.

down is complete. In general, times are recorded with either a decimal-minute or a decimal-hour watch. This is usually done by either the snap-back method or the continuous method. In the first, the watch is stopped at the end of each element and reset to zero for the next reading.

In the continuous method (most commonly used) the watch runs until the end of the study, although separate readings are taken and noted at the end of each work element. This system is preferred by labor unions because it gives an accurate picture of the total time required.

Get representative averages first

In figuring a standard, the usual first step is to calculate averages of observed times for each element. A competent observer makes certain he times enough cycles of a particular operation to get a representative average.

For example, suppose that 10 decimal-minute readings are taken on an element and noted as follows: 0.06, 0.05, 0.05, 0.06, 0.05, 0.08, 0.06, 0.05, 0.08, 0.06. Average of the 10 readings is 0.06 minutes. But suppose the observer had stopped after the first five readings which show an average time of 0.054 minutes.

Actually, the number of readings which will produce a statistically valid average can be determined by a mathematical procedure. (I) However, for practical use, there is a simplified technique that yields accurate enough results for most applications. It can be demonstrated on the foregoing example by noting the highest time (H) and the lowest time (L) observed for each element.

A value is then calculated for B as follows:

$$\text{The formula: } B = \frac{H-L}{H+L.}$$

In this case it would be:

$$B = \frac{8-5}{8+5} = 0.23$$

Next step is to seek, in the first column of Table I, the B value which is closest to but higher than the calculated value. In this case it is 0.25. In the column directly opposite this figure it is evident that 10 readings are adequate for a valid average.

However, if the preliminary study consists of

TABLE I

Value for B	No. of Readings Required	Value for B	No. of Readings Required
0.25	10	0.65	69
0.30	15	0.70	80
0.35	20	0.75	92
0.40	26	0.80	104
0.45	33	0.85	118
0.50	41	0.90	132
0.55	49	0.95	146
0.60	59	1.00	163

fewer than 10 readings, the number of required observations shown in Table I must be multiplied by one of the factors listed in Table II. For example, suppose that only seven preliminary readings were taken, and that the computed value of B from the formula was 0.43. From Table I, the closest B value on the high side of the computed figure is 0.45. Moving across to the next column shows that if at least 33 readings had been taken the computed B value would be accurate enough.

However, since only seven readings were used in computing B, the recommended minimum number of readings for practical accuracy should be multiplied by 1.30—the factor found opposite the number 7 in Table II. Thus the number of readings actually required would be 33 x 1.30 = 43.

Of course, the time required for the operation under study must also be considered. If it takes several hours to produce one part, it is obviously impractical to time a great number of cycles. Also, if the job is a short run, statistical accuracy isn't as important as it would be for production of millions of parts where a variation of 0.1 pct would be significant.

Evaluation of a worker's pace and skill is also important to good time study technique. This evaluation—called performance rating, leveling, objective rating or speed rating—converts observed times into the time a theoretically "normal" worker would require to do the job.

Judgment enters in

Here is where human judgment is sometimes questioned. The time study observer must compare what he sees with his own mental image of normal. And because he's only human, his mental image may vary from day to day.

Important thing is that the rating should be made at the time the study is taken. And the worker should then be informed of his rating.

Allowances which are added to the normal times for the various work elements will vary from job to job. Light work takes a lesser allowance for fatigue and personal needs than does hot, heavy or dusty work. Time for tool breakage and tool changes should certainly be allowed; the same goes for cleaning up and other items over which the worker has no control.

In addition to all such allowances, many firms increase the machining time by some percentage over the required amount. Thus the worker can earn a bonus by keeping his machine in operation.

Since variances in machine shop standards generally arise from method changes, the time study analyst should know correct feeds and speeds. He should also be familiar with jig and fixture design, and he ought to know if combined or simultaneous operations can be performed.

With this information he can compute approximate machining times. If observed values differ from calculated ones, say by 15 pct, he should look for an error in his calculations or for evidence that the worker is slowing his pace.

Theoretically the time study observer has no control over selection of equipment, speeds, feeds and so on. But his close observations often enable him to suggest worthwhile ideas and practices.

For time study observations to have meaning, actual machining work should be done by a person with normal skill who will cooperate by doing the job properly. Other employees are more apt to accept standards that are based on studies made of this "normal" worker.

The time study man should not operate in a vacuum. To do a fair and accurate job, he needs cooperation not only from the worker, but also from the foreman, methods engineer, and the union steward. Successful studies can be made and standards can be set in the face of opposition. But it is better and more just to all parties if they view these activities in a cooperative light.

Rules for a Successful Time Study

1. **Use proper techniques.**
2. **Choose a competent observer.**
3. **Select a competent worker.**
4. **Strive for maximum cooperation by workers, foremen, methods engineers and union stewards.**

TABLE II

Readings	Factor	Readings	Factor
5	1.75	11	0.94
6	1.47	12	0.89
7	1.30	13	0.85
8	1.17	14	0.82
9	1.07	15	*

* For 15 or more, required number of readings must be calculated in full.

REFERENCE

(1) For a detailed description, refer to "Motion and Time Study," by B. W. Niebel, p. 227. Published by Richard D. Irwin, Inc., Homewood, Ill., 1955.

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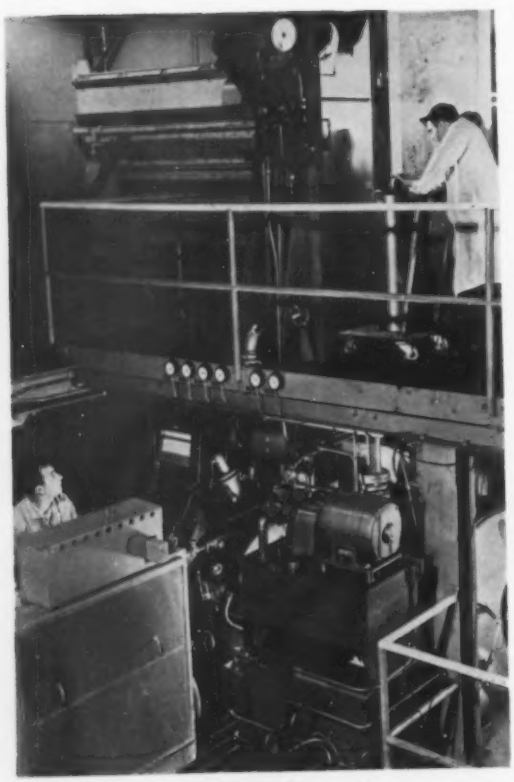
At 10 microns—

Constant Vacuum Unit Tightens Melting Schedules

◆ Vacuum melting almost daily narrows the cost gap between itself and air melting . . . Latest advance is an induction furnace designed to operate 24 hours daily, if needed, under continuous vacuum.

◆ Already in pilot production, it will melt and pour up to 2000-lb ingots at 4-hour intervals . . . No double handling, either, from charging right through automatic ejection of ingots to the production floor.



MELTING and pouring under continuous vacuum starts with charging through lock.

◆ EQUIPMENT capable of melting and pouring 2000-lb ingots under continuous vacuum will hit the production line soon. At least one induction furnace of new design can achieve this mark on a full production schedule, working at pressures under 10 microns The first installation is now in pilot operation at the Watervliet, N. Y., plant of Allegheny-Ludlum Steel Corp.

The furnace can turn out vacuum melted and poured heats one after another, without pause, at roughly 4-hour intervals. It's reportedly engineered for 24-hour continuous operation, if desired. The vacuum need be broken only during maintenance shutdown.

Eliminates double handling

Considering the production-oriented design, the new induction equipment perhaps represents the latest effort by furnace builders to bring closer the day of economical, mass-produced, vacuum melted metals. Emphasis on automatic controls reveals this, as do the design features for elimination of rehandling. The charge progresses without double handling straight through the entire vacuum melting cycle, and emerges molded into ingots.

Right now the furnace sits under the watchful eyes of Allegheny-Ludlum's research department. There it's been turning out 300-lb heats for some months. When necessary research data has been accumulated, the furnace

will move directly to the production line. To boost its capacity to 2000 lb, the furnace needs only a larger crucible. The original design provides for this.

The furnace permits bulk charging, alloying additions, taking of samples, pouring and removing ingots from melt chamber. All this takes place under continuous vacuum approaching 0.00001 of an atmosphere. This pressure is among the lowest yet reported of vacuum melting equipment specifically designed for commercial production.

Four pumps maintain the vacuum: two 500 cfm mechanical pumps, supplemented by two 16-in. high speed booster pumps. These last permit evacuating the entire furnace down to several microns pressure, absolute.

Melting high-temperature alloys

Under even the worst operating conditions, pumps hold pressure below 10 microns. Peak pumping speed occurs at eight microns. Forepressure tolerance on the system is 1500 microns, which helps reduce required backing pump capacity. The entire system, including furnace, was designed and built by F. J. Stokes Corp., Philadelphia.

Metals vacuum melted and poured in the equipment include various high temperature alloys, such as those for gas turbine disks and blades. These can be high-nickel superalloys like M-252, Waspaloy and A-286, for example.

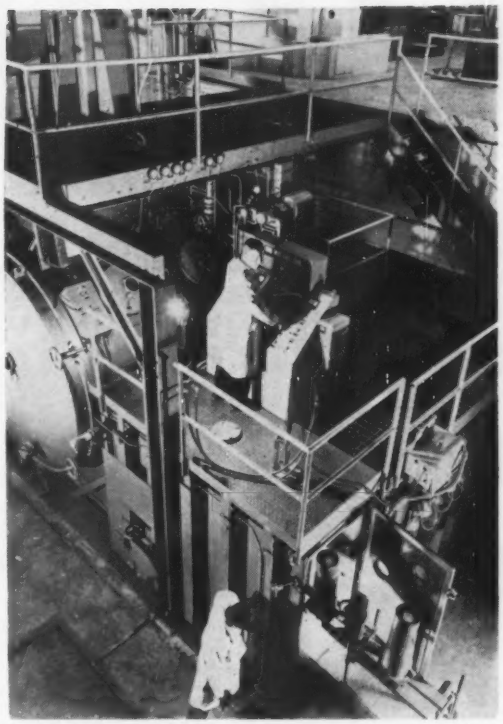
Investigation continues on the practicability and economy of vacuum melting and pouring other more common alloy steels. Among those under study are tool steels, alloys for magnetic applications, alloys for specialized corrosion service and such bearing steels as SAE 52100.

Essentially, the continuous vacuum setup can be considered as two sections: The melting chamber, within which pouring also takes place, and the three vacuum locks.

These locks provide the transition between outside air and the 8½-ft diam melting chamber, continuously held at less than 10 microns pressure. Two locks serve as entrance and exit chambers for ingot molds. Through the third, operators load the charge and make alloying additions.

The furnace is built on three levels. Melting chamber and vacuum locks for ingot handling sit on the production floor. The operator controls the entire vacuum melting and pouring cycle from a platform elevated roughly 8 ft from the floor. On a third, still higher level served by a separate ramp, both bulk charging and alloying additions take place.

Conventional materials handling equipment brings up the bulk charge, preloaded into a cylindrical container. The vacuum lock for charging mounts directly above the furnace chamber. Two rails guide the charge container



FILLED ingot molds pass through vacuum chamber (center) and emerge to production floor.

forward into the lock, and into position atop the opening leading to the melt chamber. This design speeds loading and avoids double handling of charged material.

Workers then dog tight the full-height access door on its continuous O-ring gasket. Pumps draw down lock pressure to that of the melt chamber in a matter of minutes.

When lock pressure falls to 10 microns, a gate-type valve leading to the melt chamber opens. The entire charge container then lowers into the melt chamber and enters the hot crucible. When properly positioned within the crucible, the container bottom opens and drops the charge.

Immediately on loading, some gas may start to evolve as the charge begins to absorb heat. Within one to two hours, the charge melts completely. Stirring action which characterizes induction melting assists in degassing.

Operating temperature ranges between 2500° to 3000°F, depending on alloys being processed. Induction heating furnace works at 1200 cps, energized by 500 kw. The same power will handle the 2000-lb melts planned later. Ohio Crankshaft Co. supplied induction equipment.

Melting operations are carried out under carefully controlled conditions. A mass spectrometer qualitatively determines the amount of all gases present in the vacuum system, while high speed electronic equipment records melt temperature and system pressure.

Offers micrometer accuracy

Let Ultrasonics Probe for Proper Part Thickness

◆ As a reliable means for making fast, accurate checks on thickness of bulky or contoured parts, ultrasonic resonance testing is hard to beat . . . It's fast and dependable, and permits checks without removing work from the machine.

◆ And, it's accurate—equivalent to micrometers in measuring thickness of skin-milled plates, for instance . . . One semi-automatic scanning arrangements permits 700 readings per hour . . . Here are samples of how the method is being used.

By P. K. BLOCH,
Vice President,
Branson Instruments, Inc.,
Stamford, Conn.

◆ ULTRASONIC RESONANCE GAGES are coming into their own as a means for making fast, accurate thickness measurements on a workpiece, from one side, either before, during or after regular machining operations. They're particularly useful for manual or semiautomatic gaging of large parts or parts with difficult geometry.

Operating procedure is quite simple. A small probe or transducer is applied to transmit continuous, high frequency sound waves into the part, through a thin layer of a suitable coupling material. The ultrasonic waves are reflected by any discontinuities they meet, including, for instance, such things as thin air gaps between two metal plates.

Thus the operator has only to glance at a cathode ray tube with calibrated scales, to read thickness instantaneously.

Several good equipment-at-work stories point up the usefulness of the technique. First of these is the measuring of large aluminum plates, held in steel vacuum chucks during skin-milling operations.

Wing sections of jet fighters and bombers are now generally made by contour-milling on tracer-controlled milling machines. Sections run to pretty good size, and plates may be 10 by 30 ft by 3 in. thick before machining. Final dimensions will run from 0.500 to 1.800 in. in rib sections, and from 0.060 to 0.250 in. in the thin pocket or skin sections.

Tolerances on such work usually range from ±0.001 to 0.002 in.

In practice, a limited number of points are usually checked before the workpiece is removed from the chuck. If the plate's still too thick, additional machining is a simple matter.

Once out of the machine, the plate gets a thorough going-over from the inspection crew. Final skin checking usually covers about 200 points, and takes about 4 hours. This takes in time spent accurately locating test points and for recording the measurements along the way. Accuracy is considered as good as that obtained with micrometers.

Thin aircraft skin sections and sections with continuous tapers instead of ribs are frequently milled by immersion in chemical solutions (see IRON AGE, Nov. 17, '55: Chemical Milling Leads To Stronger Structures). Actual minimum thickness of the sheet must be known with

THICKNESS TESTER finds use at Lycoming's Stratford plant for measuring thicknesses ranging from 0.055 to 0.008 in. Here, cone for ram-jet flameholder assembly gets quick check.

this method to set the proper etching time.

A special ultrasonic scanning arrangement was made to determine this. Designed by Ultrasonic Testing and Research Laboratory, Van Nuys, Calif., it enables the operator to make and record 700 readings per hour on large sheets. This production rate was equivalent to that of a four-man crew, using deep-throat mechanical calipers for the job.

The arrangement was relatively simple. The gage itself was mounted on a carriage so it could be moved along the edge of the table. The small oscillator and probe were mounted on a cross rail. The operator successively rotates a crank to move the transducer across the large sheet; pushes a button to squirt oil underneath the transducer and to bring the transducer down, and records thickness on an electric typewriter. He then releases the transducer and moves on to the next test location.

Good accuracies obtain. These range from ±0.0002 to 0.0005 in. on sheet thicknesses of from 0.005 to 0.125 in.

Several companies are working out plans to use the gage in the near future for measuring thickness continuously during the chemical milling operation, while the sheet is immersed.

Ability to measure from just one surface makes ultrasonic equipment particularly useful on tubular products. Transducers can be applied to either the inside or the outside of the part, whichever is more convenient. Accuracy depends on thickness range to be covered. If this range is very limited, and careful calibration techniques are used, reproducible accuracies of ±0.0002 in. are possible.

Guided missiles frequently contain large cylindrical or hemi-spherical aluminum and steel sections with complex, close-tolerance machining. Mechanically gaging them would require either a very elaborate setup or the removal of the part from the machine tool for thickness measurements.

With ultrasonic gaging, it's possible to check the part while it's held in the machine tool. The machinist normally takes a series of ultrasonic thickness measurements before he reaches final thickness, then uses the ultrasonic measurements to determine the depth of his final cut, or the adjustment to be made prior to making the final cut.

This use of ultrasonic gaging during machining has eliminated rejects for thickness.

Two other current applications are interesting. One involves the forging of large flat plates to form the heads of cylindrical pressure vessels and other sections of spherical vessels. The operations reduce thickness in some sections substantially. Because of size, it's very difficult to get accurate thickness measurements except near the edges.

Now, ultrasonic gaging before and after forging makes it possible to determine the thickness reduction at various points, and to pick plates of proper thickness to compensate for the reductions. Plates up to 2.5 in. thick can be checked to ±0.002 in. accuracies.

Wave guides are another illustration. Some types require the drilling of a series of holes along the center line of the cavity (ID) on the long rectangular tubes. Because of wall thickness variations, normal machining techniques were resulting in wave guides with variable characteristics.

Ultrasonic equipment was set up to measure wall thickness to within ±0.0001 in. The difference in wall thickness at various points was then used to adjust the drill position.

INSPECTORS CHECK thickness of this large aircraft-wing-section plate on a Giddings & Lewis skin mill. Final dimensions run from 0.060 to 0.250 in. in skin sections, with tight tolerances.

Weld Complex Jobs Faster With Multipurpose Machine

◆ Welders can now handle an amazing variety of jobs . . . With better equipment and improved techniques, it's not so much a matter of which welding technique will do the job, but which will do it best and at lowest cost.

◆ HIGH-PRODUCTION welding requires and justifies equipment and techniques specially tailored for the job. But it's difficult to justify expensive setups where the job moves from overhead welding, then to vertical, to flat, etc., on a wide assortment of joints. It's in such instances that multipurpose arc welding machines and modern electrodes meet the test in coping with the varied problems.

Ortner Car Co., Cincinnati specialists in the design, construction and repair of rolling stock, proves this point. Using iron powder electrodes and combination arc-welding machines, it took on the job of building 45 special all-welded gondola cars. These have since been delivered to a midwestern steel producer for intra-plant handling of strip coils in loads up to 100 tons.

◆ Multipurpose arc welding machines and iron powder electrodes prove helpful . . . This combination simplified construction of an all-welded fleet of gondola cars . . . The machine made it possible to switch from one type weld to another quickly.

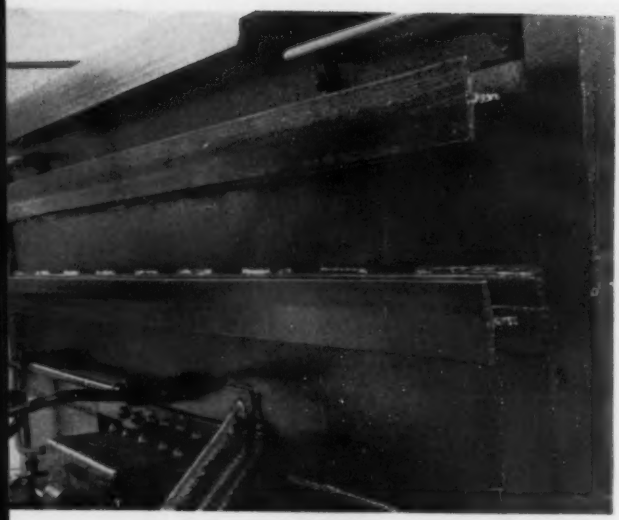
These haulers tip the scales at a light weight of around 53,500 lb, as against the average for standard-sized gondolas of around 42,000 lb. The extra weight's considered essential for the strength and stiffness needed.

Some of the welding problems involved are suggested by other constructional features.

Take side sheets (plates) and floors, for instance. These are made up of $\frac{3}{8}$ and $\frac{1}{2}$ in. stock, as against $\frac{1}{4}$ and 5/16 in. stock for regulation gondolas. End stiffeners and side posts are rolled H-beam sections, rather than of the usual formed sheet construction.

Double angle sections overlap on the tops of the car sides, and double vertical angles reinforce the four corners inside and out. Body bolsters have double webs and exceptionally

CLOSEUP of body bolster weld shows how slag peels off readily with iron powder electrode. Welds were made in position; called for flat, vertical down, overhead and sloping beads.



H-BEAM SECTIONS substitute for conventional formed sheet end-stiffeners and side stakes. Intermittent, iron-powder electrode welds eliminate spatter, improve finish painting.

heavy top and bottom flanges. Cross bearers, stringers, floor support angles and fishbelly support angles all are far heavier than is customary.

Ortner found that, using the modern combination arc welder and the iron powder electrodes, they could select the most favorable welding procedure for lowest costs on every joint.

For instance, tack welds and out-of-position welds required dc while for all flat position welds, run at high speed, ac was favored. A Lincoln Electric built Idealarc multi-purpose welding machine makes quick switches from one to the other possible. This provides either ac or dc as well as control over arc characteristics, to produce a soft or forceful arc.

Iron powder electrodes of the E-6027 type were used on continuous welds in the flat position, such as the joints between the four heavy floor plates and the attachment of floor plate angles and fishbelly support angles to the side sheets.

These gave welding speeds up to 17 ipm, along with spatter-free, smooth and uniform beads. The same electrodes were employed for making intermittent 6 in. fillet welds on the H-beam stiffeners of the end sections. These were made, flat position, in a work-high fixture.

A novel welding procedure was devised in attaching the floor support and fishbelly support angles to the 40 ft sides. At first, after tack welding in a fixture with the angles held firmly to the plate by hydraulic jacks and hold-down bars, a finish weld was started at one end and run the length of the joint continuously.

Trouble with this was that the side plate bowed noticeably, despite the hold-downs and the fast travel speed. So a new sequencing was introduced which might be described as two-directional, over-and-under backstepping.

This involves starting at the center line of the car and laying down, in reverse direction, a 20 to 22 in. bead. That is, from 20 in. away from the center back to it. This was repeated on the opposite side of the center line, then on the underside of the angle in the same way. After these four short passes, the cycle was repeated for another 20-in. bead, backstepping to overlap the first beads slightly.

Thus the four fillets were gradually worked out to the car ends, and with heat distribution being equalized and stresses counterbalanced, a continuous, corrosion-sealing weld was obtained. There was no side-sheet distortion.

The term fishbelly refers to the contour of the gondola side, which has its lower edge 28 in. below floor level. The additional depth of steel at the fishbelly, with the longer H-beam posts in this area, provide extra strength and stiffness against longitudinal deflection from load concentration in the center.

Heavy duty body bolsters are a modified box section, with double webs capped top and bottom by extra wide and heavy binder plates. The lower plate has a "kickup" on either side at approximately the wheel line, resulting in changes in depth in the webs.

Flange formed in single piece

Slope from the center sill is about 25° upward and then downward to the outer end at about 45°. The flange is formed in a single piece in a press brake for the full width.

Welds in the bolster assembly are made in position, as the floor frame is being assembled in a fixture. Downhand, vertical down, overhead and sloping traverses are required. To handle these effectively, a new iron powder electrode, an E-6013 equivalent, was used. This all-purpose electrode offers a minimum of spatter and a quick-peeling slag. Two passes were made with this electrode in 3/16 in. diam, and ac current, on the bolster welds.

Good used, structurally suitable center sills and trucks were used to hold costs down. Cross bearers alternate between four alternate flat plates, which pass under the stringers and three main bearers forming webs, flanges.

A filler is welded the full length of the sill, to which are welded the four floor plates, one seam running the length of the car at the center and the other across at midpoint.

A gap of ½ to ¾ in. is left between the floor plates to be filled with two passes of the iron powder, E-6027 electrode, using ac current. Result is a clean, smooth surface, with no crevices to accumulate water, possibly rust.

FOLLOWING a turning operation, internal gears are handloaded onto gravity conveyors feeding deburring machines. As shown, gears turn automatically to flat position before deburring.

Simple Feed Increases Deburring Output

◆ The problem: Find a better means for deburring transmission gears, cleanly and on a high-production basis . . . Answer: combine a fully automatic deburring machine with a simple, gravity-type handling chute feed.

◆ Results have been everything hoped for . . . Fully automatic installation handles both internal, external gears . . . Safety devices prevent malfunctioning . . . A single operator supplies parts for two such deburring setups.

By W. G. PATTON, Engineering Editor

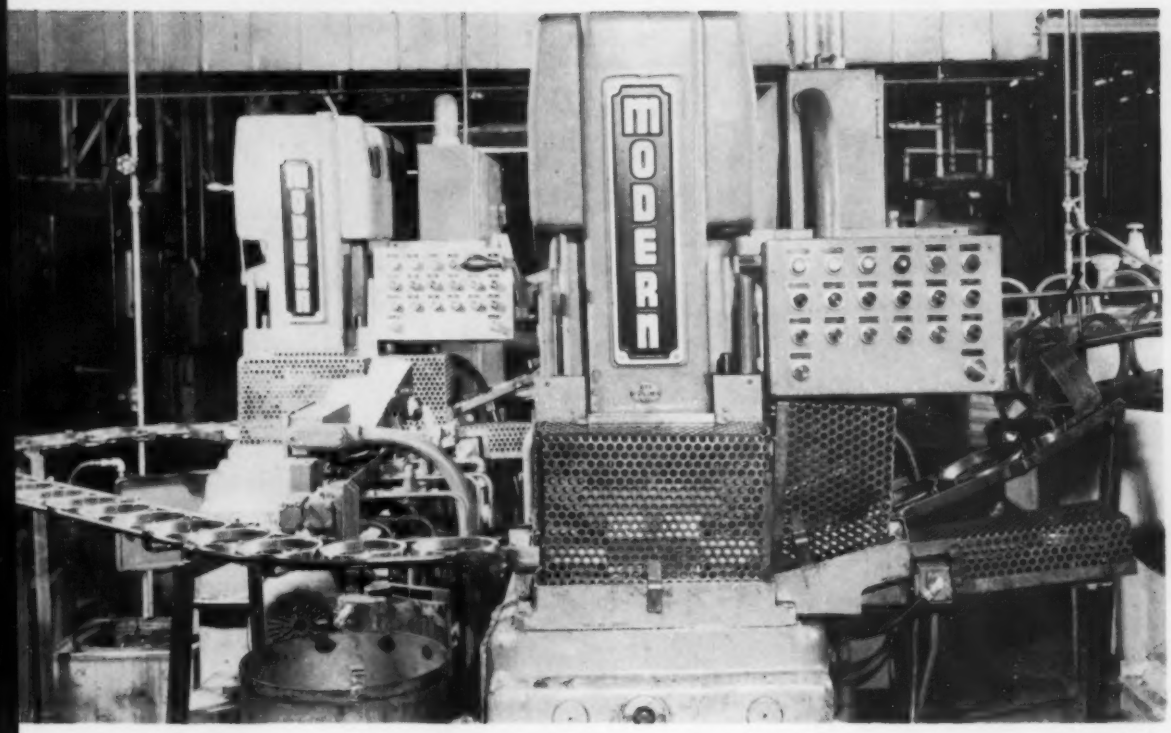
◆ WHERE POSITIVE deburring and a steady flow of parts at high production rates are required, modern plants have several deburring methods and machines to choose from. Most can be extended even further in capability by being fitted out with latest automatic feeding and unloading devices.

GM's Detroit Transmission Div. offers a good example of what can be done. Not entirely satisfied with its previous setup for deburring internal and external transmission gears, it switched over to a new arrangement, combining a simple, gravity-type handling chute feed with a fully automatic deburring machine.

Thus rigged, the Burr-Master machines, made by Modern Industrial Engineering Co., load, cycle and discharge gears entirely automatically. A single operator supplies parts for two such machines from the previous machining step.

Operation has been highly satisfactory. Here's how it works with internal gears:

These gears are 6.200 in. in diam and have 68 teeth. They come up for their combined deburring-chamfering treatment following an outside diameter turning operation, but otherwise machine-finished. First they're placed on a gravity-type storage and handling chute. This is designed to take advantage of the fact that these internal gears roll easily when placed on edge and properly supported.



OVERALL VIEW shows fully automatic 1-station deburring machines (second unit at rear left) with duplicate feeding, discharging conveyors. Machines shown deburr only one side.

Gravity takes care of moving them forward. As they reach the end of the chute, they are turned automatically from their edge position. Thus they feed into the deburring machine lying flat and one at a time.

This arrangement assures a constant feed of gears to the machine, and permits the entire deburring and chamfering operation to proceed uninterruptedly and automatically.

Loading disk picks up gear

With the machine in automatic position, next step is for a loading disk, rotated by a loading cylinder, to pick up one gear at a time from storage. The gear slides forward into loading position. As the cycle in progress completes itself, the new part moves along to the first work station, and is centrally located above it.

A spring loaded receiver now places the gear on the work spindle. Five indexes of the pilot gear are allowed to make certain the teeth of the part are properly engaged for deburring and chamfering.

As the quill moves downward, the gear moves into contact with the radial gaging pinion that turns in timed relation to the splined driver. This interaction assures that the spline driver, mounted on the spindle, will enter the internal gear teeth.

The quill continues to carry the piece down into the work station. As the part locates properly in the work position, a limit switch starts the chamfering cycle. When the workpiece has made one complete revolution, and all teeth are chamfered and deburred, the reciprocating action of the form cutter stops in the retracted position. The part is then raised from the work position.

Next, the now-deburred and chamfered part is returned by an elevator to a conveyor for removal from the machine.

In the operation described, deburring is performed on on side of the gear only. However, other 2-station units of this type deburr both sides of the gears, using a turnover device between the deburring units. Machines of this type can be used for both internal and external gears.

Several safety devices have been built into the machine. If the loading storage ahead of the machine is empty, for instance, the machine stops. If the storage conveyor is filled and cannot accept additional gears, the machine will also stop automatically. Or again, the machine stops automatically and a warning light is energized if the timing relay times out, indicating a prolonged cycle.

High speed steel tools for the machines described are of three general types—circular, blade and dovetail. Regrinding of these form tools requires only grinding of the cutter and locating face. Relief grinding's not necessary.

Five times as fast—

New Machine Scalps Piston In Three Seconds

ONE OPERATOR at scalping machine controls can rough-turn 1200 pistons per hour.

◆ ALUMINUM auto engine piston castings are being rough-turned at the rate of one every three seconds. This is five times as fast as previous production.

Considered to be the only one of its kind in North America, a new machine installed at the Aluminium Co. of Canada, Ltd., Etobicoke, has more than lived up to expectations. Engineers had asked for a machine to turn-out better than 1000 per hour. This so-called "scalping" machine removes flash and surplus metal at a 1200 per hour rate.

Dissatisfied with an older method using a hand-loaded, single-spindle lathe technique, they called in the Standard-Modern Tool Co., Ltd., Toronto. Standard-Modern designed and produced the unit, which is adaptable for piston sizes up to 5 in. diam and 5 in. in length.

Essentially, production of the piston involves four stages: (1) casting, (2) scalping, (3) inspection and (4) finishing. The scalping operation is based on four vertically mounted work spindles located on a continuously rotating work table. As the work table rotates all movements are controlled by a hydraulic valve in the machine's center column.

As each spindle passes the operator, he removes the rough-turned piston and replaces it with a pinion casting. An expanding chuck locates on the inside core of the casting directly under its dome. The chuck shoes position the piston skirt so that turning is in correct relation to the inside diameter. Steel fingers move out to engage the wrist pin holes, securely clamping the piston during the rough cut. The chuck is actuated by the hydraulic cylinder designed into the work spindle.

After clamping, the work spindle begins rotation at 2000 rpm. Vertical and horizontal tool slides then move in simultaneously. The tool at the left turns the piston's skirt while the cutter at right moves down to machine the dome according to the predetermined shape of a cam bar. The bar controls machining of a flat, undercut or contoured dome.

40 hp motor drive

The unit's hydraulic power pack is powered by a 40 hp electric motor at 1200 rpm. Driving a tandem pump, the motor enables a large pump to drive the work spindles and actuate the tool slides at 50 sfpm at 1000 psi. A smaller fixed delivery pump is directly connected to a hydraulic motor which drives the work table at constant speed.

Solving one problem creates another, though. Production of 1200 scalped pistons per hour makes aluminum chips at such a rate that it was necessary to enclose the entire operation with a shield. The by-product is carried off through a chute at the machine's rear. Paddles travelling in a circular trough surrounding the work table push them onto the chute. A conveyor then transports them from the machine area.

Yours.. for the asking

The proper material for sintered bronze or iron bearings has always been a major problem to design men. Now for the first time a chart has been engineered, clearly showing the complete chemical, mechanical, and work characteristics of a wide range of sintered bearing materials. The best material for most applications can be selected by a draftsman in a matter of minutes. Only requests on company stationary will be honored.

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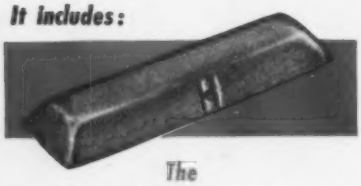

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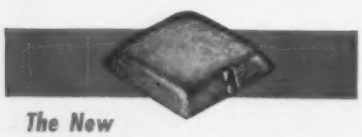
HANNA 38-POUND PIG

The foundryman's favorite standard pig. Available in all grades, silvery and HannaTite. A good example of the quality that has made Hanna "the best known name in iron."



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New Technical Literature:

Catalogs and Bulletins

Engineering services

Locating and holding non-symmetrical or out-of-balance components during processing operations frequently poses difficult problems. One company that has helped solve many such problems during the past 50 years has just published a limited edition of a brochure. It describes several unusual applications of its creative engineering and manufacturing work. *Write on company letterhead to Garrison Machine Works, Inc., 515 Bannock Street, Dayton 4, Ohio.*

For free copy circle No. 1 on postcard, p. 113

Atom lab described

New literature covers a nuclear firm's facilities, operation and organization. It describes the laboratories research and development facilities at Garden City, L. I., and outlines services offered in such fields as reactor design, nuclear instrumentation and experimental studies. A section of the booklet relates the varied nature of the laboratories' experience in the atomic energy field. *Walter Kidde Nuclear Laboratories, Inc.*

For free copy circle No. 2 on postcard, p. 113

Pump catalog

Publication of a new pump catalog said to provide a new concept in pump literature structure and logic has been announced. Described as a "continuity" catalog, the 20-page three color piece defines the firm's entire new internal gear rotary pump line, now organized in five basic series. The catalog, conceived with general-to-specific type logic, begins with three sets of double pages containing three special tables. These are said to simplify immensely the selection of appropriate pump models for user applications. *The Wayne Pump Co.*

For free copy circle No. 3 on postcard, p. 113

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 113.

Power plant control

A 12-page booklet describes power plant control equipment. Reviewed in detail are combustion and boiler feed water control, pressure reducing, desuperheating and automatic soot blowing, the latter including retractable and rotary soot blowers. *Copes-Vulcan Div., Blaw-Knox Co.*

For free copy circle No. 4 on postcard, p. 113

High strength fasteners

High strength steel aircraft bolts having a minimum tensile strength of 220,000 psi and high strength self-locking locknuts designed for use with the bolts are described in two technical pamphlets. Bolts are discussed in detail giving tension-tension fatigue charts, and tensile and shear strength graphs. Cutaway photographs show how firm's bolt, nut and washer operate together as an aircraft assembly unit. *Standard Pressed Steel Co.*

For free copy circle No. 5 on postcard, p. 113

Capillary tubing

Restrictor tubing is described in a new leaflet. This new promotional leaflet on Capillary tube for restriction purposes covers the advantages of plug drawn "Capilator" for metering flow of liquids and gases and highlights testing and control features. What they mean for finished products in various industries is also reviewed. *Wolverine Tube Div., Calumet & Hecla, Inc.*

For free copy circle No. 6 on postcard, p. 113

Pump lubricators

Detailed operating information on high capacity spring discharge piston pump lubricators are included in a service instruction sheet. The lubricators are operated by pushing down handle against stroke adjustment cap and allowing spring to slowly discharge a predetermined amount of oil into the distribution system. Instruction sheet discusses operation, "starting a new machine," maintenance, and service. A large photograph shows various components of the piston pump mechanism. Data sheet contains various hints and tips on lubrication with the automatic system. *Bijur Lubricating Corp.*

For free copy circle No. 7 on postcard, p. 113

Heat transfer

Data on how to cut heat-transfer costs in a wide range of industrial applications is contained in a new catalog. It features a detailed description of how certain units are constructed, emphasizing how they have been engineered to overcome all types of heat-transfer processing difficulties. The bulletin lists and illustrates ten major advantages claimed for the product, and shows how each of them contributes to savings in installation, upkeep, and in initial cost. Specifications and dimensions are listed for all four major styles. *Tranter Mfg. Inc., Platecoil Div.*

For free copy circle No. 8 on postcard, p. 113

Broaching machines

Mechanical details and operating advantages of a line of horizontal guided-ram type surface broaching machines are given in a bulletin. It lists machine data for 12 models in the line that have normal capacities of 10, 15, 20 and 25 ton and stroke lengths ranging from 90 to 240 in. Bulletin also contains photographs and brief descriptions of typical jobs being broached successfully on these machines. These machines are designed for use in either automated or manually loaded installations, depending on the requirements of the particular application. *Colonial Broach & Machine Co.*

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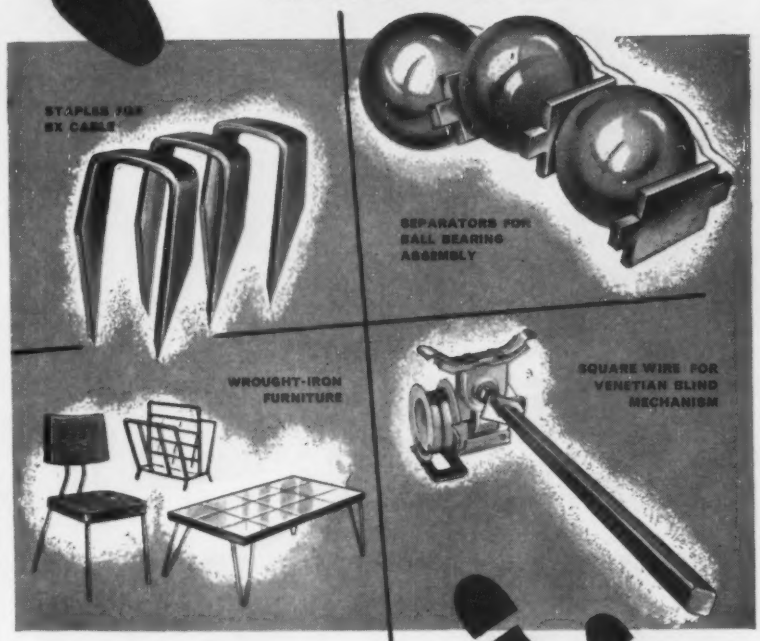
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SERVICE-SCORE STICKERS provide valuable wire rope facts

...to test performance, speed reordering

For efficient wire rope operation you must have wire rope facts—brief, handy, accurate facts. You need them for safety (when did that line go on?). You need them for reordering (what size is the hoist line?). And you need them most of all for figuring cost (how long did it last?).

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Leschen's Service-Score Stickers provide such a system. The facts are always at hand—on the machine while the wire rope is working, and in the record book from then on.

Service-Score Stickers make it easy to compare the service you get from various rope constructions, types, and brands, so you *know which one is best* for you.

With the Service-Score System you prove to yourself that Red-Strand wire rope consistently exceeds industry standards for strength and safety.

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H. K. PORTER COMPANY, INC.
St. Louis 12, Missouri

FREE TECHNICAL LITERATURE

Presses, not aspirin

"How to Cure Piercing Headaches" is the title of a booklet just released. Using cartoons and brief text, the booklet explains advantages of one firm's turret punch presses for short to medium production piercing of flat sheet metal and plate. Specifications are also given for the complete line of the company's turret punch presses ranging from hand operated, 7½ ton capacity machines to a 150 ton press with a 60 in. throat. *Weidemann Machine Co.*

For free copy circle No. 10 on postcard, p. 113

Welded stainless tube

Just published brochure explains how welded stainless steel tubing is manufactured at one company's plant. The pamphlet provides answers to a great number of questions often asked about welded stainless steel tubing. *Damascus Tube Co.*

For free copy circle No. 11 on postcard, p. 113

Meters and controls

Over one hundred measuring, transmitting, receiving, recording, and indicating instruments and control components for power and process applications are described in a new 8-page bulletin. It includes detailed literature reference for each product as well as 24 instrument and control applications. Addresses and phone numbers of all district offices also are listed. *Bailey Meter Co.*

For free copy circle No. 12 on postcard, p. 113

Tubular products

Engineers, buyers and others involved with the problem of determining the proper specifications to apply to various carbon, alloy and stainless steel tubing, pipe, seamless welding fittings and flanges, are expected to be interested in a new four-page folder. Folder is a ready cross reference between the steel, the application and the specification covering the product. Reference specifications are those of the ASTM, AAR and a number of special company specifications covering the products mentioned. *Tubular Products Div. Babcock & Wilcox Co.*

For free copy circle No. 13 on postcard, p. 113

now, Crucible low nickel stainless steels that meet many of your needs . . .

Here are two *new* Crucible grades, Rezistal type 201 and 202 that are similar in quality and properties to types 301 and 302 . . . but with desirable features all their own.

In the annealed condition, for example, Rezistal 201 and 202 have about 10% higher strength than 301 and 302, yet maintain almost identical ductility. This means that these grades can be fabricated with ease equal to their counterparts. In addition, their mill finishes and corrosion resistance to a wide variation of media compare most favorably with 301 and 302.

To sum up: Rezistal 201 and 202 have practically all the desirable properties of 301 and 302, *plus* some of their own. And they're available *promptly* in all forms. Write now for data sheets fully covering the properties of these new stainless grades. *Crucible Steel Company of America, Dept. AIA, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor—Railway & Power Engineering Corp., Ltd.

"Tumblex* 'T' has a definite place in our tumbling department"...

Leading pump manufacturer lists benefits gained from Norton ALUNDUM TUMBLEX 'T' abrasive*

The executive we're quoting based his decision on parts difficult to deburr with his previous tumbling abrasive. Test runs with Tumblex "T" abrasive, the new Norton bonded, triangular shaped tumbling abrasive, gave him these results:

Part A — 100% increase in barrel payload and 80% reduction in tumbling time. A sandblast operation eliminated and hand deburring reduced about 75%.

Part B — Barrel production increased 20%, tumbling time reduced 25%.

Part C — Barrel production increased 25%, tumbling time reduced 50%.

Part D — Sixteen hours hand deburring saved per 1000 parts.

Tumblex "T" abrasive is one of the most revolutionary tumbling abrasives ever developed. Everything about it is designed for better barrel finishing.

Its uniform triangular shape and size prevents wedging in recesses . . . Made of famous bonded ALUNDUM abrasive, it cuts fast, with no cutting compound needed . . . It provides maximum surface contact with parts being processed, for shorter cycles and larger payloads . . . It wears evenly, and when worn down can be used on parts requiring a smaller abrasive . . . Its lightness means less weight required to fill the barrel.

Results are more uniform finish, shorter time cycles and lower costs per piece finished.

Send For Work Samples

to our Sample Processing Department. Let us prove to you how the latest barrel finishing equipment and techniques can add the "Touch of Gold" that improves product quality and cuts finishing time and costs. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

G-315

TUMBLEX "T" ABRASIVE brings three big advantages to barrel-finishing: non-wedging triangular shape; fast-cutting bonded ALUNDUM abrasive; long, even wear. Especially effective on intricate-shaped parts. Available in four sizes.

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*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 108.

Structural framing

Dozen page booklet gives review of structural framing and company's complete range of light gage steel sections with many applications in commercial, industrial and residential structures. It offers, booklet states, substantial savings in weight and cost compared with conventional hot rolled sections. Product's advantages are listed. Photographs and diagrams show its use in partitions and outside walls. Typical details of partitions are included in construction drawings. *Dominion Bridge Co., Ltd.*

For free copy circle No. 14 on postcard

Fastener clips

Trouble saving steel fastener clips are described in new literature with accompanying samples. These clips are used for sliding around the bolt of a wiring or hose clamp. This holds tension during arranging and while screwing on the nut. It can be inserted around a clamp bolt with an easy motion to fasten or release the clamp's prongs for repeated adjustments while arranging wiring bundles and lines on jigboards, or when fastening hose. Fastener is made to fit a wide variety of bolt sizes. *Pastushin Aviation Corp.*

For free copy circle No. 15 on postcard

Ceramic protecting tubes

Bulletin illustrating and describing one company's line of ceramic protecting tubes has been issued. Listed are various sizes of tubes available in the different materials and prices. Included also is general application data for the tubes. *Claud S. Gordon Co.*

For free copy circle No. 16 on postcard

Socket screws

"Why A Multiple-Spline Socket Screw" has just been released. Bulletin explains reasons for use of multiple-spline method of power transmission in a socket screw and describes advantages and applications. These screws are available in both set and cap screw types. *The Bristol Co.*

For free copy circle No. 17 on postcard

Checks, tags, dials, etc.

Colorful and complete. That describes a new multiple page catalog covering a manufacturer's extensive line of checks, tags, badges, signs and virtually anything stamped from metal. Badges, number plates, carfare tokens, and more are clearly pictured, some in color. Text gives explanation for each of thousands of items useful to industry. Dials, panels and engraved plates are covered in this piece of graphic art. *Jas. H. Matthews & Co.*

For free copy circle No. 18 on postcard

Roll planishing

Data sheet introduces roll planishing fixtures as a continuous, localized, controllable cold working process designed to flatten and improve the formability of fusion seam welds. It explains how roll planishing is a time tried process used to improve the mechanical properties of welds made in aluminum alloys, stainless steel, unalloyed titanium, carbon and low alloy steels. It describes and illustrates company's model with a 60 in. throat. Planishing speed is 180 ipm. Shipping weight: 2830 lb. *Airline Welding & Eng. Co.*

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Dust, fume control

Informative brochure describes methods of collecting and controlling magnesium alloy dust and fumes. Among other metals this can create hazards during processing operations when improperly handled. Brochure can be used as reference literature by plant executives and managers of metal working plants as well as factory personnel who directly machine or found metals of magnesium alloys. *Peters-Dalton, Inc.*

For free copy circle No. 20 on postcard

Aluminum bar stock

Illustrated technical brochure contains details on new hollow aluminum bar stock. Publication discusses tolerances, mechanical properties, and applications of the hollow machining stock. Case studies and comparison charts, demonstrating machining performance of the material compared to conventional solid bar, are also presented. It gives tables of standard sizes available in round and hexagonal stock, listing wall thicknesses, dimensions, and weight per foot. *Harvey Aluminum.*

For free copy circle No. 21 on postcard

Case history book

Case history book gives quick-reference tooling and production details, including photographs and sketches, on fourteen widely different types of work now being produced on company's basic machines, with various combinations of firm's standard tooling methods and units. New edition's case histories cover a range from needle valve stems for outboard motors to the machining of plastic parts. *Bodine Corp.*

For free copy circle No. 22 on postcard

Lift conveyor

How one vertical lift conveyor can replace costly elevators, save space and the time and cost of an elevator operator is described in a new bulletin. Illustrations show a variety of applications to which the vertical lift can be put and where it can be installed to save time and space in many operations. *The Rapids-Standard Co., Inc.*

For free copy circle No. 23 on postcard

Milling machines

Description is given of one firm's milling machine in a four page folder. The single machine can do horizontal, vertical, angular or universal milling. In one set up, the colorful reading matter states, without use of fixtures, milling, drilling and boring operations may be performed to extremely close tolerances. Machine is described as offering dependable, accurate operations. Complete specifications are given on rear of folder. *U. S. Burke Machine Tool Div.*

For free copy circle No. 24 on postcard

Electronic circuitry

Release of a new four page index guide of basic components for plug-in unit construction has been made. Booklet contains a series of hardware components necessary to mount, house, fasten, connect and monitor electronic or electrical circuitry, and gives complete prices and specifications on each component. *Alden Products Co.*

For free copy circle No. 25 on postcard

Motor graders

Understanding a motor grader and the operation of its controls are the first step in becoming a proficient operator. Knowing how to apply these controls to get the desired results is the second step. And practice is the third. So states "Basic Blading," a 32-page manual with illustrations on the use of the controls, basic blade positions and their applications, and the control positions to accomplish many of the jobs a motor grader does. It is also available in Spanish, French and Portuguese. *Caterpillar Tractor Co.*

For free copy circle No. 26 on postcard

Radial draw formers

New 60-page catalog emphasizing the newly-developed radial draw formers has just been issued. It contains examples, illustrations and diagrams of radial-draw forming machines that will handle work up to 300 or more ton, down to semi-automatic radial-draw forming machines that will produce work for automobile trim at the rate of 600 pieces per hour. *Cyril Bath Co.*

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NEW KAYDON THIN-SHELL NEEDLE BEARINGS

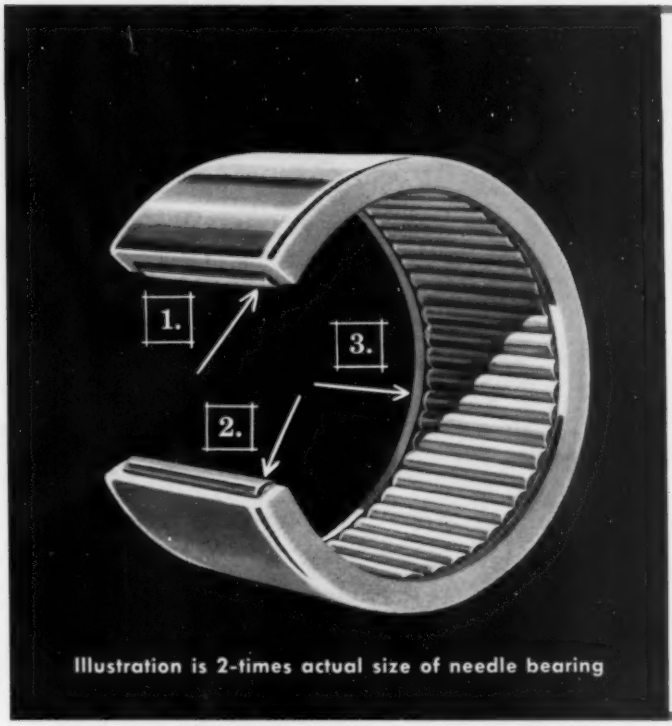
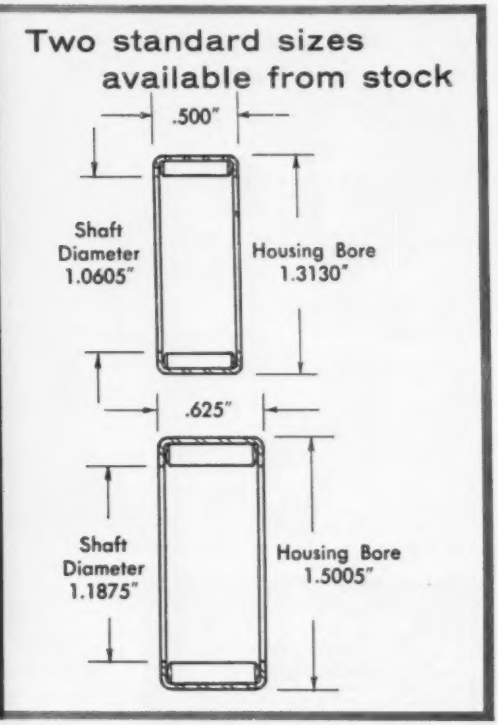


Illustration is 2-times actual size of needle bearing



You get these Kaydon design advantages:

1. **Greater effective length needle rollers for MORE CAPACITY (41% on ½" width)... LONGER LIFE (2.8 times as much on ½" width)**
2. **Simplified construction that SAVES you money**
3. **Pre-packed lubrication that SAVES assembly time**

HERE it is! Kaydon's new thin-shell needle bearing. A bearing that gives you more of everything — more capacity... more economy... *plus longer life* than any other comparable bearing, because of greater effective length of spherical end rollers.

This new bearing is ready for you right now from stock in two standard sizes (illustrated). Other sizes will be available later.

For complete specifications, ask for Data Sheet No. K562—write, call or wire Kaydon of Muskegon.

THE KAYDON ENGINEERING CORP.

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All types of ball and roller bearings — 4" inside diameter to 124" outside diameter... Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Spherical Roller • Needle Roller • Ball Radial • Ball Thrust Bearings

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DIAMOND PERFORATED METALS

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To meet these widely diversified and constantly growing requirements we have developed hundreds of specialized tool arrangements which enable us to give superior service at competitive costs.

Write for Catalog 39 and tell us about YOUR requirements. No charge or obligation for estimates and money-saving suggestions.

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West Coast Plant, Diamond Perforated Metals Co 17915 So. Figueroa St., Gardena, Calif.

WELDING: Pickling Crates

Crates are reconditioned . . . Welding with Monel electrodes makes joints as resistant to corrosion as parent metal . . . 25 additional years use is expected.

Reconditioning fabricated pickling crates that have been in daily service since 1928 has extended their anticipated life another 25 years. It has also saved Sharon Steel Co., Sharon, Pa., the cost of new equipment.

Performed by Strohecker, Inc., Enon Valley, Pa., rebuilding the crates was a relatively simple job after they had been redesigned to utilize the old structural members. It consisted of taking the old riveted crates apart, inspecting the members and reassembling them. Welding with Monel electrodes made the joints as resistant to corrosion as the parent metal.

Dozen Crates Reconditioned

Since the reconditioning program began, Sharon Steel has had 12 of their crates reconditioned. The crates, used for pickling carbon strip steel, are 9½ ft long by

Here's the reconditioned pickling crate, minus racks.

53 in. wide and weigh 1500 lb each. Lengthwise members are 3 x 4 in. solid Monel, and cross members are 1½ x 3 in. Each crate carries a batch load averaging between 8500 and 10,000 lb or five to six times the weight of the crate itself.

To give some idea of the service the crates have been subjected to, Sharon's pickling line is set up to handle three crates at a time. Each crate is submerged in the sulfuric acid pickling bath for about nine minutes. Depending upon the size of the strip steel, between 150 and 300 ton are pickled per eight hour shift.

Some Parts Lasted 25 Yrs.

As a regular part of the reconditioning, the Monel accessories, consisting of lift yokes, pins and yoke hooks were inspected. Other than straightening, it was found that these parts did not need replacement or special treatment after twenty-five years of service.

The pickling combs originally used by Sharon on these crates were made of cast alloy, but in constant use, the combs cracked frequently and gave relatively short service life. In 1952, Sharon changed to wrought Monel for pickling combs and because of its toughness and resistance to pickling solutions, service life was substantially increased.

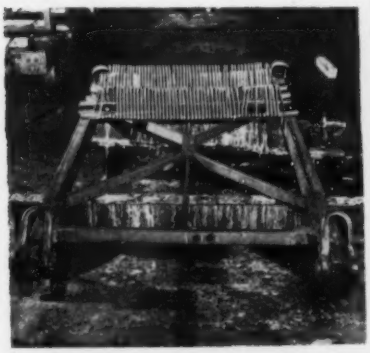
No Production Delay

As a result of Sharon Steel's reconditioning and modernizing program, the company has been able to renew its pickling crates and accessories without delaying production. Periodic inspection of

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

each crate insured against breakdown in service and, at the same time, made certain that equipment gave maximum safe service life. Occasional welding was performed over the original 25 year



Long-used old pickling crate with racks to hold sheets.

life span of the crates to repair service-damaged parts.

Sharon Steel now anticipates a total of approximately 50 years of productive service from its fabricated crates with only minor maintenance necessary over the next 25 years.

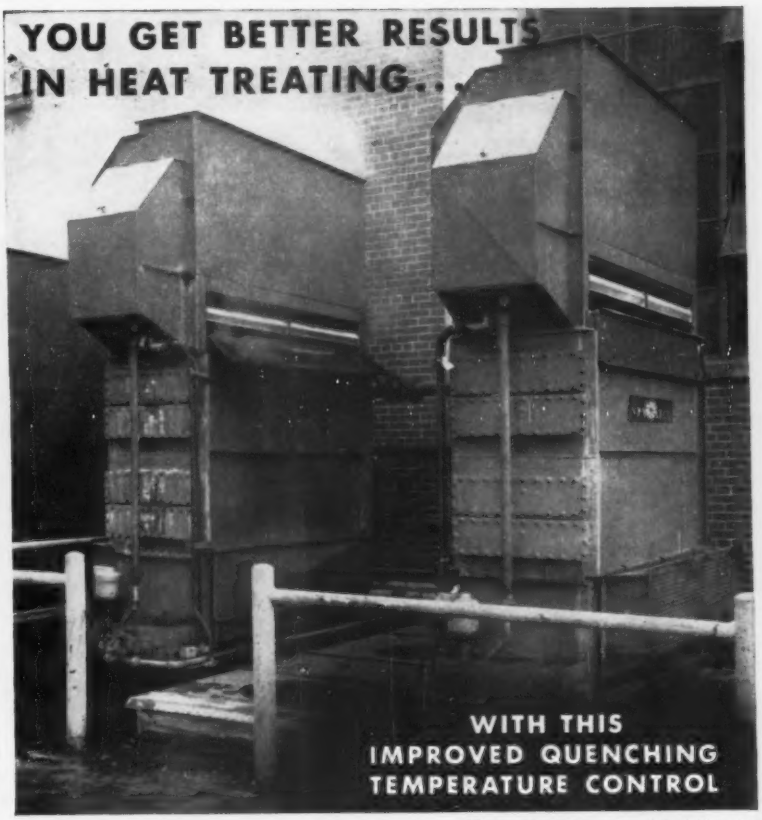
Annealing:

New furnace finishes tube to 4 in. OD.

Capable of maintaining a high quality finish on welded stainless steel tubing from ¼ to 4 in. OD, a new continuous bright annealing furnace has been installed at the Steel & Tubes Div. of Republic Steel.

Retains Surface Qualities

It retains the surface qualities of the original flat-rolled steel finish on welded stainless tubing without subsequent need for polishing for many applications. As a result, it can eliminate the high cost of polishing traditionally borne by the tube purchaser. At the same time, it reduces ordinarily required pickling operations. The resulting pickling is for cleaning purposes rather than scale removal as required in ordinary furnaces.



Photograph...Permission of Ford Motor Co.

● Use the NIAGARA AERO HEAT EXCHANGER to control the temperature of your quench bath and you remove the heat at its rate of input, always quenching at the exact temperature that will give your product the best physical properties. You get uniform results throughout the day's production, prevent losses, avoid rejections, increase your heat treating capacity.

The Niagara Aero Heat Exchanger transfers the heat to atmospheric air by evaporative cooling. It extends your quenching capacity without using extra water. It pays for itself with water savings.

In the installation illustrated the quench is caustic soda. Water also is accurately cooled and the system is easily kept clean. With an oil quench an extra advantage is to prevent flash fires.

You can cool and hold accurately the temperature of all fluids, air, gases, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. With the Niagara Aero Heat Exchanger you have closed system cooling, free from dirt and scale.

For further information write for Bulletin No. 120

NIAGARA BLOWER COMPANY

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District Engineers in Principal Cities of United States and Canada

Says "Dependable Dan"—

Off-the-floor on-the-spot ready-to-use —that's warehouse steel

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One of the most important quality advantages of this process is assurance of a scale-free inside diameter, especially on long length small diameter tubes. These are difficult to pickle clean when annealed in a furnace that allows scale to form.

It has a rated capacity of 1000 lb per hr at a maximum temperature of 2100°F. The furnace proper consists of four high temperature alloy steel muffle tubes extending through a gas-fired furnace and connecting with tubular, water-cooled chambers. Alloy wire mesh chain belts extending through these carry the work through heating and cooling chambers which cover an area 78 ft long.

Power-Driven Feed

It has power-driven feed and discharge conveyors, for handling the work to and from the furnace. The conveyors, along with the mesh belts carrying the work through the furnace, have adjustable speeds which permit variation of the traverse speed to suit the work being processed. These speeds vary from one to six feet a minute.

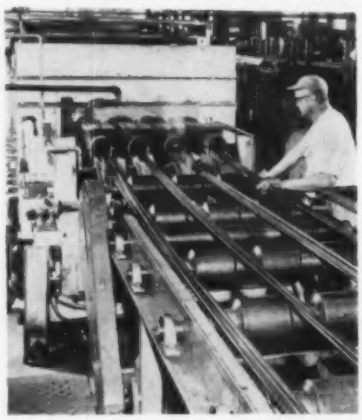
Republic Steel maintains that the appearance of the bright annealed tube is more appealing. Standard pickling practices leave an open "frosted" surface which readily scratches and picks up contamination and discoloration. The bright annealed tubes have dense smooth surfaces much the same as the original cold rolled surface of the flat-rolled stainless steel and offer considerable sales pull over a pickled or frosted finish for some applications. In addition to this, the resulting dense, smooth surface enhances the resistance to corrosion.

Standard Practice

The standard practice of annealing stainless steel tubing in open furnaces results in heavy scaling of the work. Removal of the scale calls for a particularly expensive pickling process which, in addition to being time-consuming, results in the loss of metal. For many applications, stainless tubing so produced must be further processed by polishing both inner and outer circumference.

Previously Limited

Until only recently, the bright annealing of stainless tubing has been conducted on a limited scale. The method differed greatly from bright annealing. Abrasion and scratching, particularly on heavier stainless tubing, was often the result because the work was drawn or pushed through a muffle type furnace. This had a water-cooled distribution chamber. It was charged with dissociated ammonia atmosphere to secure the bright finish. The difficulty of meeting requirements of surface finish, high temperature, extremely pure atmosphere and rapid cooling to avoid carbide precipitation had, in the past, prevented the development of furnaces for bright annealing of the complete range of sizes in welded stainless tubing.



Furnace has a rated capacity of 1000 lb per hr at 2100°F.

Management:

Industrial safe-vision subject of confusion.

In the United States alone more than 80,000 persons have lost the sight of one eye as a result of industrial hazards. Nearly 8,000 have lost the sight of both eyes as a result of these accidents. Such are

The PROOF of the STEEL is in its PERFORMANCE

Courtesy Lamar Pipe & Tile Div., American Marietta Corp.

DSC Welded Wire Fabric Puts Crack-Resistance Into Concrete Construction

Here's a section of 120″ LO-HED reinforced concrete pipe. You can see how big it is from the trucks and pipe storage yard in the background.

What you don't see is the DSC Welded Wire Fabric bonded into the concrete. Its latticed construction gives the pipe flexible steel muscles, makes it strong and durable, gives it crack-resistance.

For the very same purpose DSC Fabric goes into many other kinds of concrete construction. Here is a partial list:

In pavements—for streets and turnpikes

At airports—in aprons and runways

In the home—in floors, walls, foundation slabs, patios, swimming pools

On the farm—in silos, barns, feeding floors and yards

All types of industrial structures . . . Precast products of all kinds . . . Driveways and sidewalks . . . Bridges.

DSC Welded Metal Fabric is "woven" at our Portsmouth Division, Portsmouth, Ohio. The "threads" consist of Portsmouth Bright Basic Low Carbon Reinforcing Wire. The "warp and woof" intersections are spot-welded electronically.

Here, job-performance is the ability of the Fabric to resist estimated stresses and strains. It depends on sound welds and conformity to size, gauge and physical requirements.

Whether it's Rod and Wire products or Sheet or Strip—DSC *steelmanship* is the same. A DSC Customer Representative is eager to work with you.

Call him . . . today?

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Hot Rolled and Cold Rolled Sheets
Cold Rolled Carbon Steel Strip • Flat Cold Rolled Carbon Spring Steel
Low and Med. Carbon Manufacturers' Wire • High Carbon Specialty Wire
Aluminum Cable Strand Reinforcement • Rope Wire • Tire Bead Wire
Welded Wire Fabric

MILLS | PORTSMOUTH, OHIO (Sheets, Rods, Wire)
DETROIT, MICH. and HAMDEN, CONN. (C.R. Strip)

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Adv. Courtesy DSC

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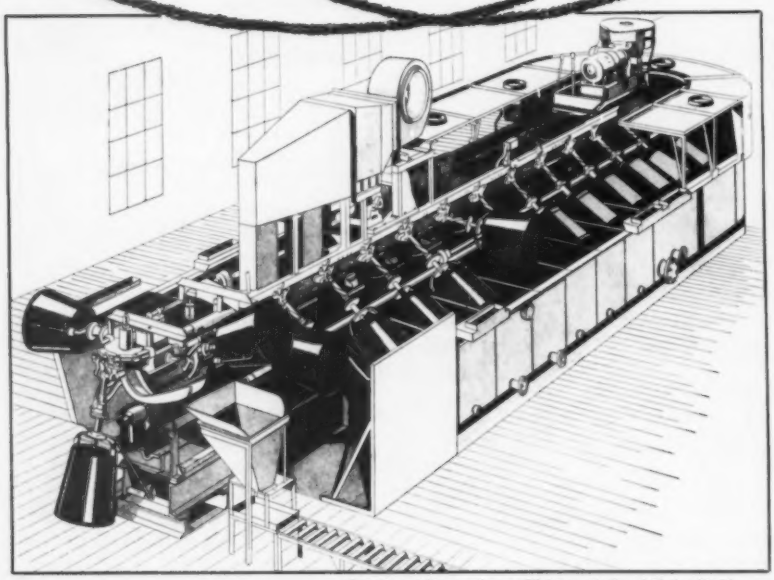
Barrel Plating by Stevens Really Cuts Costs



End View of Stevens Super "E" Automatic Barrel Plating Machine.

Since Stevens first introduced the Automatic Barrel machine scores of industries have enjoyed these operational advantages. Check them against your present operations.

MINIMUM LABOR REQUIRED — In most cases, one unskilled employee can operate the machine.

HANDLES THE COMPLETE CYCLE — Including cleaning, pickling, chromate treatments, plating, bright dip and drying.

COMPLETELY AUTOMATIC — No barrel lids to fasten and unfasten during automatic loading and unloading.

BETTER HANDLING — No mixing of parts. Becomes a part of a straight line production system.

NO HEALTH HAZARD — Occupational health hazards eliminated with ventilation of equipment.

UNIFORMITY OF PLATE — Accurate plating cycles timed to meet your requirements.

FITS ANY PLANT LOCATION — Does not need special buildings—Can be moved at any time. Low head room.

DEPENDABLE — Scores of machines in use. Machine design and construction constantly improved.

LOW INITIAL COSTS — For average operation lowest initial machine costs.

LOW MAINTENANCE COSTS — Proven over years of use and in varied operations.

FREDERIC B. STEVENS INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

Let a Stevens Sales Engineer show you how you can cut costs in your plating operation with a Stevens Automatic Barrel. Write us direct. Frederic B. Stevens, Inc., 1816-18th Street, Detroit 16, Michigan.

METAL FINISHING EQUIPMENT AND SUPPLIES, FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

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the findings of Dr. H. W. Hofstetter in a book titled, "Industrial Vision."

The importance of industrial vision is not fully understood, Dr. Hofstetter says. The fact that an employee's eyes are tools as specialized in their application as the hammers, gauges, and files he uses to carry on his trade has often been disputed by experts, he notes.

Reasons For the Confusion

"The confusion," he adds in the volume published recently by the Chilton Co., "seems to lie in the attempt to associate vision characteristics with specific jobs or typical jobs classifications, rather than with the vision requirements or the visual demand specifications of the job." He points out that industrial job classifications are based on criteria that have no connection with vision and oftentimes a great majority, if not all, of the individuals in a given sample will have vision superior to the minimum required for the job.

Dr. Hofstetter is the director, Division of Optometry, Indiana University.

Metallurgy:

Useful 12 pct chromium steel omits columbium.

Development by the Navy of a useful 12 pct chromium steel modification without columbium has been reported by the Office of Technical Services, U. S. Dept. of Commerce.

The report describes creep-rupture properties of the 12 pct grade modified by additions of molybdenum, vanadium, columbium, titanium and carbon. Tests were conducted at 1100° and 1200° F for materials as-cast, cast and homogenized, forged and normalized, and forged, normalized and tempered. Room temperature properties also were determined.

Among other results, a modification containing 1.0 pct molybdenum and 0.7 pct vanadium showed creep-rupture properties which compared favorably with the best of the columbium-free alloys developed so far.

Finishing:

"Wooden" cabinets are made from metals

Sheet steel and aluminum are being processed into finished grained mahogany and lined oak cabinets which are "indistinguishable from wood." So says the Westinghouse Electric Corp. The company is now turning out the cabinets in production at their plant in Metuchen, N. J.

A "monorail," or electric crane hoist, lifts and transports sheets to the fabrication area. A power shear cuts the metal blanks to specific sizes. Strips are then conveyed to an adjoining power press which pierces, notches, extrudes, and forms the metal to specific cabinet sizes.

Semi-automatic unit applies wood grain on metal cabinet.

Bender Forms Body

The next step brings the sheet to the bender. This forms the cabinet body and welds the bottom in one operation.

The completed cabinet is then automatically conveyed through a series of mechanical operations: (1) washing, (2) degreasing, (3) coating with iron phosphate at a temperature of 160°F, (4) cold rinsing, and (5) a mild acid solution as a final rinse to neutralize the phosphate. From this stage, it is conveyed to a dry-off oven.

Base Coat Is Applied

After the drying stages, the cabinet is automatically conveyed

DEMING
TURBINE PUMPS

They Tap a "Gold Mine" Right Under a Plant!

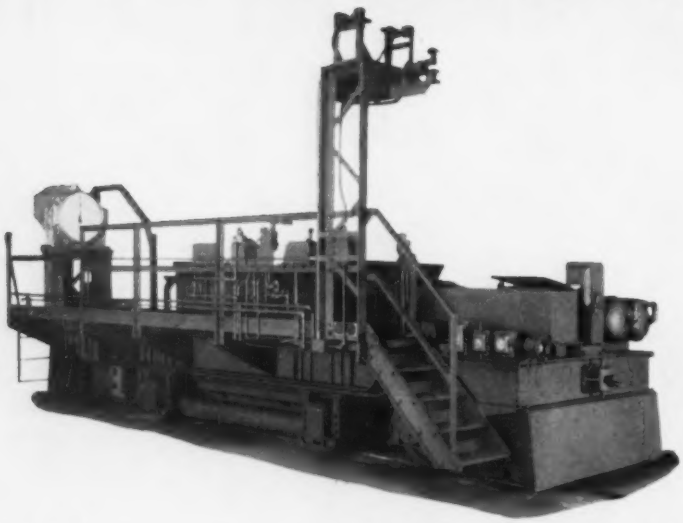
Looking for ways to reduce costs? Don't overlook WATER COSTS! Your company may own a "gold mine" of underground water. Why not use it to reduce WATER COSTS!

Delivering water from deep wells, lakes or streams for factory water supply is one of the biggest uses of DEMING TURBINE PUMPS. *In many cases, these dependable pumping units have cut water costs in half.*

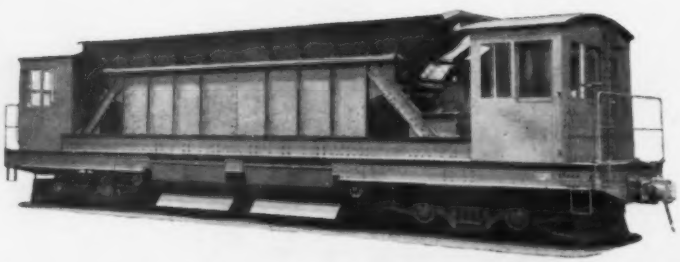
Ask us for free, illustrated Bulletin No. 6700 and the names of Deming Distributors in your area.

THE DEMING COMPANY
566 Broadway • Salem, Ohio

HERE'S *built-in* STAMINA *that spells* DEPENDABILITY

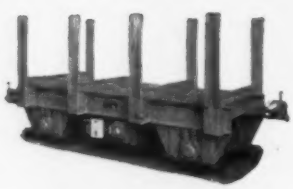


10-TON SCALE CAR, SINGLE HOPPER, BOTTOM DUMP



75-TON ORE TRANSFER, GABLE BOTTOM, SIDE DUMP

Atlas "single-lever" Safety-Type transfers give outstanding short-haul service . . . such as between buildings, for cross-bay crane service, and movement in production. Powered to meet your operating needs . . . storage battery, diesel, or gas-electric, or cable reel.



Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

to a waterfall spray booth, where paint is applied to the cabinet's inside.

In the next process, a base coat is applied by an electrostatic spray system before graining. The cabinet is conveyed through a baking oven for 20 minutes at 325°F. It is then moved to a semi-automatic machine which applies a wood grain of desired choice. The cabinet is then conveyed through another oven of 350°F.

The cabinet moves to a second electrostatic spray system which applies a clear lacquer coat for permanent finish. Finally, the cabinet is baked again for 20 minutes at 300°F.

Handling:

Ingenuity plus wooden saddle equals more storage space.

Many hours and dollars are spent by researchers trying to find new ways to squeeze more use out of storage floor space. Every once in a while, though, a non-expert

Wooden saddle makes use of almost 100 pct more space.

will come up with a "why didn't someone think of this before" idea. Such was the case at the Norton Co., Pittsburgh.

Two warehouse employees became dissatisfied with Norton's conventional way of stacking palletized grinding wheels. So they invented a method that allows al-

MEMO TO: *You*

YOU MIGHT AS WELL try to count the beans in a carload as the number of parts that are made of Roebling High Carbon Specialties, Flat Wire and Spring Steel. These Roebling products are unsurpassed for mechanical and dimensional uniformity . . . for speeding manufacturers' production and cutting costs.

Next time you order cold rolled high carbon wire or spring steel specify Roebling. Strictly on its performance you'll probably become a steady customer from then on. John A. Roebling's Sons Corporation, Trenton 2, N. J.

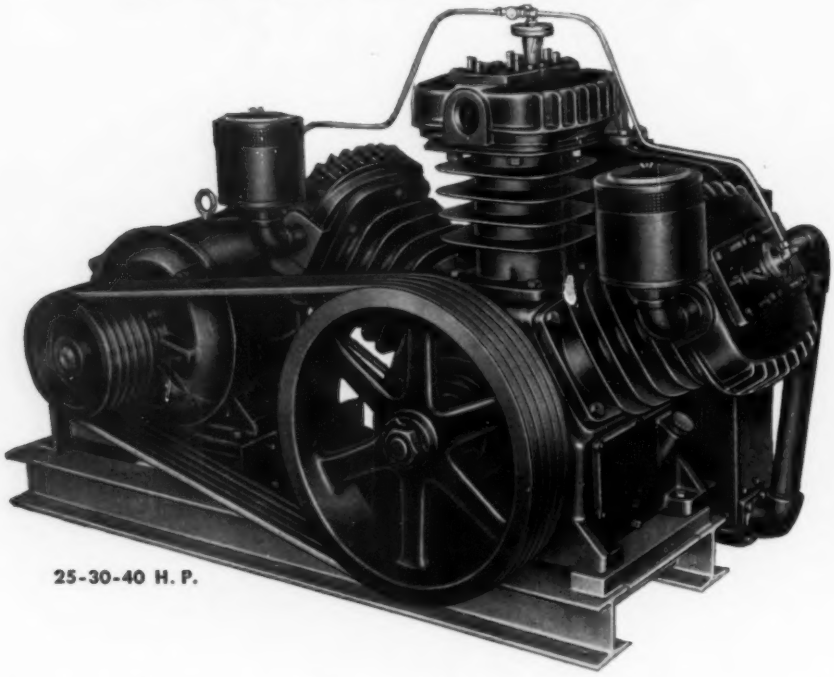
ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N.Y.

THE NEW CURTIS MODEL C-100
TWO-STAGE, AIR-COOLED AIR COMPRESSOR

Provides Higher Operating Efficiency Costs Less to Install



25-30-40 H. P.

THIS NEW Curtis Two-Stage will deliver more air per minute, per horsepower and per kilowatt hour of electrical energy consumed, thus assuring a saving in your electrical bill.

It's Air Cooled, thereby eliminating expensive water bills and assuring quick and easy installation with no complicated plumbing problems.

The new C-100 embodies all the well-known Curtis engineering features such as centro-ring oiling and Timken Main Bearings.

For complete information write for illustrated folder.

Remember, you can count on . . . OUR 102nd YEAR

Curtis

MANUFACTURING COMPANY • PNEUMATIC DIVISION

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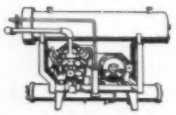
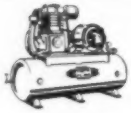
AIR HOISTS
AIR CYLINDERS



PACKAGED LIQUID
CHILLERS



AUTOMOTIVE
AIR COMPRESSORS

AUTO LIFTS

PACKAGED
AND
REMOTE
AIR
CONDITIONING

most a 100 pct increase in the utilizing of floor space.

Wooden Saddle Is the Key

Key to the system, invented by L. Dauer and J. Lippert, is a wooden saddle. Made of palletized lumber, reinforced with a steel strap, this saddle makes it possible to stack pallets of grinding wheels three or four high. The former "pyramid" stacking allowed about half as many pallets to be stacked in the same area.

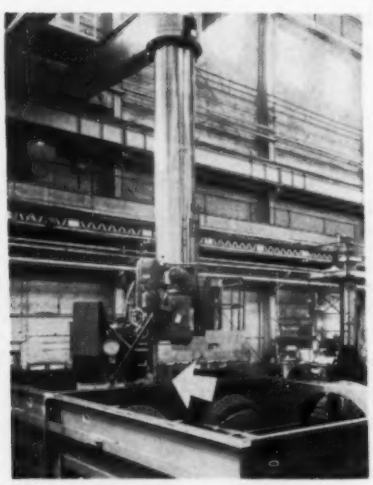
Many customers, says the company, have adopted the saddle system.

Machining:

Crane-mounted drill press handles large castings.

A crane-mounted radial drill press is being used to drill 1-7/64 and 1-7/16-in. diam holes in the water box for a 100,000 sq ft condenser.

Conceived by Allis-Chalmers machine tool engineers for use at their West Allis Works, the unit is capable of reducing set-up and drilling time as much as 60 pct. It consists of a crane bridge



Crane-mounted drill (arrow) positions in a few minutes.

mounted on the lower crane rails in the erection shop, a trolley that runs laterally to crane movement, a 30-in. diam column, and a drilling unit.

Photo courtesy of Caterpillar Tractor Co., Peoria, Ill.

it's only part of the HTM* story...

STRENGTH

High ultimate strength of HTM castings helps the famous Cat D7 Tractor do the tough jobs day-in and day-out. Vital parts, such as the front idler adjusting nut shown, are made from HTM metal . . . the metal with the high ultimate strength that resists wear and fatigue under heavy loads.

And there are lots of other "plus" advantages in HTM castings. For example, they possess excellent non-seizing properties . . . can be either liquid or air-quenched . . . can be given a smooth finish. Perhaps *most important of all, HTM machinability index ranges from 80 to 90 (B1112 steel = 100).*

HTM castings can often reduce manufacturing costs, weight and assembly time . . . can increase quality and sales potential of *your* product. AA-8746-A

***HTM**—*High Tensile (Heat-Treated) Malleable*

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868 • Cleveland 6, Ohio

the nation's largest independent producer of malleable and pearlitic malleable

The drilling unit consists of a conventional drill press head and arm from a 4-ft radial drill press, modified somewhat to suit this adaptation. It is able to drill three in. holes in mild steel and 4-in. holes in cast iron. Vertical stroke of the machine's column is about 15 ft and trolley travel about 50 ft. A compressor-operated mist-coolant system is also included.

Set-up time on jobs employing the drill press is said to have been materially reduced. Previously, a drill press was moved into position on parallels to drill holes in large pieces. Then the entire set-up was dismantled, moved and re-assembled to complete the operation. With this tool, the operator can position the drill anywhere over the ¼-mi long erection floor. A pushbutton station controlling five motions permits positioning the drill fast and accurately. The machine is equipped with limit switches and interlocks.

. . . To Your Specifications

ERIE Bolts • Studs • Cap Screws • Nuts

In Alloys • Stainless • Carbon • Bronze

Your most exacting specifications take precision form in the hands of our expert craftsmen. Bolts—Studs—Cap Screws—Nuts as specified to resist corrosion, extreme temperatures and tensile stresses are the product of more than 40 years continuous production of highest quality fasteners for a wide diversity of industries.
Send us your specifications for prompt estimate.

A SUBSIDIARY OF BARIUM STEEL CORPORATION

ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives In Principal Cities

Metals:

Aluminum laid 10 times faster than steel.

Pipe and coupling equipment for the longest aluminum pipeline to be used in an overseas oil field have been shipped to Karachi, Pakistan. The 12 mi. pipeline will be laid on top of the ground and can be uncoupled and moved easily.

Lightweight aluminum pipe is quickly laid and coupled.

Light weight aluminum pipe, developed by the Reynolds Metals Co., is relatively new to the oil industry. However, more than 300 mi. are already in use in the U. S. Reports Reynolds: typical installations have produced installation savings up to 90 pct and 70 pct in hauling.

In an actual installation in Texas, reports the company, three men and one truck laid a mile of pipe ten times as fast as steel pipe of comparable dimensions. It took only nine manhours and three hours of truck time. An estimate on steel pipe was made at 98 manhours and six truckhours.

Aluminum pipe is produced by extrusion. Hence, no seams. A 30 ft section weighs about 30 lb; 30 ft of steel pipe weighs more than 200 lb.

Power:

Temporary power delivered by plant-on-wheels.

The Venezuela Development Corp. is currently expanding and re-locating its cables and systems. To provide service while this is being done, they ordered twin generator mobile units to solve the power problem. These were produced by the White Diesel Engine Div. of the White Motor Co.

The 712 hp diesel engines operate at 900 rpm. One man can operate the 500 kw set.

Also being made in 350 hp sizes, the units are built into Fruehauf trailers and are hauled wherever needed by gasoline powered White tractors with 145 in. wheelbases.

Heart of the system is a diesel engine fed fuel from a tank on the trailer's belly. One tank of fuel can drive the generators at capacity for 12 hr. All essential parts are standard production items. Generator in the 500 kw units is a three phase, 60 cycle unit developing 2400 v.

Since they can operate on lower quality diesel fuels, even remote areas are said to be a fuel source.

Corrosion:

Coated steel halts corrosion, less costly than alloy.

Protection of equipment against corrosion and of materials against contamination by reaction with the equipment can in most cases be more inexpensively obtained by using a steel vessel with a protective coating than a vessel fabricated entirely of a special alloy. This is the finding of the Protective Coating Div., Metalweld, Inc. of Philadelphia.

Dirt Must Be Removed

Mill scale, rust, dirt and paint stencils must first be removed, of course. Secondly, the surface must have the proper "etch" for good adherence.

Surface cleaning and preparation is done by two types of blast cleaning equipment. Small equip-

When you buy Acme-Gridley
you get SERVICE
ANYTIME, ANYWHERE

"Accidents don't just happen, they are caused," says a safety expert. But regardless of when or how they occur, you should know that good service can reduce downtime and expensive delays.

In this case, several Acme-Gridleys sustained damages that included broken control panels, cracked top plates, crushed conduits, and broken motor frame castings and guards. Prompt action of our service department got replacement parts to this user quickly—minimized his production losses.

National Acme

The NAMCO nameplate on your machine assures service — in emergency or normal situations — when and where you need it.

THE NATIONAL ACME COMPANY • 175 East 131st Street, Cleveland 8, Ohio

ment is brought into a large blast room at Metalweld where the surfaces are cleaned with No. 30 angular steel grit handled through equipment supplied by the Pangborn Corp., Hagerstown, Md. The abrasive is blown through a hose and nozzle, by compressed air at 80 to 100 psi from the plant system. Spent abrasive is reclaimed, separated from the scale and rust and recirculated.

Portable Units Used

Tank cars and other vessels too large for the blast room comprise 75 pct of the firm's work. Tank cars are processed quickly and efficiently on a siding at their plant. Other vessels erected on the spot or too large to move economically must be treated away from the plant.

Tank cars and field work is accomplished with 15 Pangborn portable blast cleaning units using a silicon carbide grit. The portable unit is connected to a source of air and the hopper of the portable

Both operator's helmet and blast hose are supplied with air.

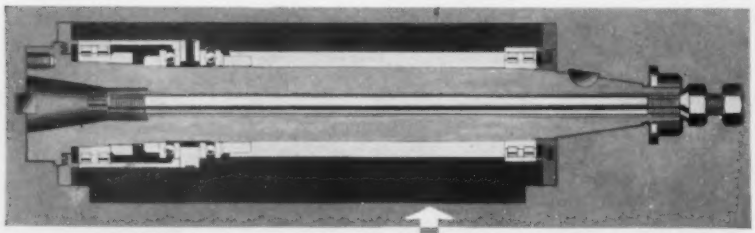
unit is kept filled with the abrasive particles. Additional air is supplied to the operator's helmet. Air under suction removes dust, and ventilates the vessel or tank car.

After a tank car, for example, is blast cleaned, which requires about eight hours, the protective coating is applied. Many coatings need curing or drying which is done by hot air or steam circulated inside the car.

Welding:

Iron powder electrode allows fast welding of truck.

With total load capacity of 30,000 lb, a super-size straddle truck for dockside use by the Belgium Port Commission has been custom built by the Hyster Co., Portland, Ore. Welded with Air Reduction's iron powder contact electrode, Easyarc 12, this bigger-than-usual job was completed in almost record time, a 20 pct savings in man hours over conventional electrode time being effected.

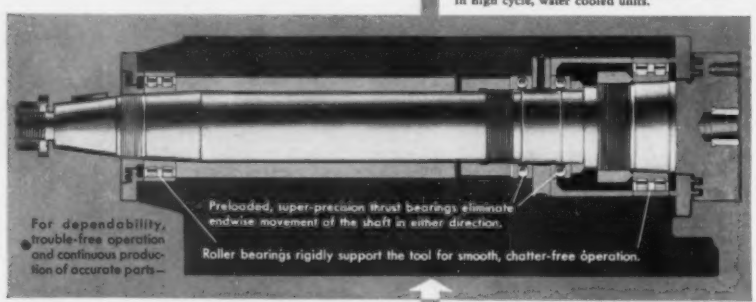


PRECISION MILLING
calls for this
POPE
Heavy Duty
MILLING SPINDLE

See for yourself! Here is one sturdy package with a massive shaft, and double row cylindrical roller bearings and ball thrust bearings that support your cutting tools rigidly to do their best work.

POPE P-12000 Series Belt Driven Precision Milling Spindles are operable in any position. They come in sizes from 1 to 50 HP with standard milling machine tapers in the nose from #10 to #60. Bulletin S-8 gives complete dimensions. Let us mail you a copy.

POPE Heavy Duty Milling Spindles are also available in P-2500 Series, MOTORIZED, from 1 to 100 HP, totally enclosed, fan cooled; and in high cycle, water cooled units.


Preloaded, super-precision thrust bearings eliminate endwise movement of the shaft in either direction.
For dependability, trouble-free operation and continuous production of accurate parts—
Roller bearings rigidly support the tool for smooth, chatter-free operation.

PRECISION BORING
calls for this
POPE
Heavy Duty
BORING SPINDLE

Look it over! Here is a Boring Spindle capable of boring holes round within *millionths of an inch*. It produces fine surface finishes in the lower micro inch range.

POPE Super-Precision Heavy Duty Boring Spindles are available in both belt driven and motorized units to meet a wide range of speeds and horsepower. Send us your specifications for quotations.

Pope designs, engineers and builds SPECIAL SPINDLES

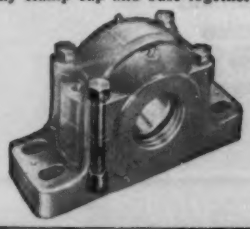
No. 112

Specify **POPE** PRECISION SPINDLES

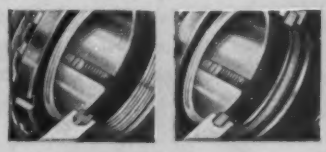
POPE MACHINERY CORPORATION
Established 1920
261 RIVER STREET · HAVERHILL, MASSACHUSETTS

MORE FACTS on why more and more leading manufacturers choose Link-Belt bearings

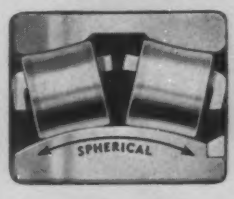
SUPER-RUGGED CAST STEEL HOUSING. Proper positioning of cap on base is assured by large-size dowels. Four heat-treated thru-bolts and serrated steel nuts firmly clamp cap and base together.



CHOICE OF SEALS. Spiral labyrinth steel seals, left, are for oil or grease lubrication and heat conditions. Combination felt and synthetic rubber contact-type seals, right, for grease lubrication.



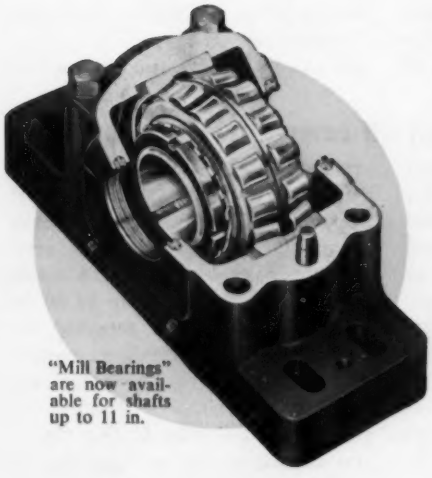
SELF-ALIGNING ROLLER BEARING is self-contained and adjusted at the factory—needs no shims or alignment rings at installation. Design assures free rolling under even the toughest conditions.



Link-Belt "Mill Bearings" with cast steel housings withstand severe impacts and heavy loads in this modern pipe mill.

"Mill Bearings" with cast steel housings

designed by Link-Belt to take industry's heaviest loads and hardest impacts



"Mill Bearings" are now available for shafts up to 11 in.

● To stand up to the sudden shocks and impact loads met in steel mills, mines, foundries, oil field applications and on heavy equipment, Link-Belt has designed the extra tough "Mill Bearing." It's the precision Link-Belt self-aligning roller bearing mounted and protected in a durable cast steel housing.

Thoroughly-proved Link-Belt "Mill Bearings" maintain full load capacity even with shaft deflections and misalignment often existing in extremely heavy service. And their simple, efficient design assures long life and free rolling.

Link-Belt makes industry's most complete line of ball and roller bearing blocks. So whatever you need, you'll find the answer in this quality line. Ask any of the 40 Link-Belt offices or an authorized stock-carrying distributor for Data Book 2550 and Book 2565A on "Mill Bearings."

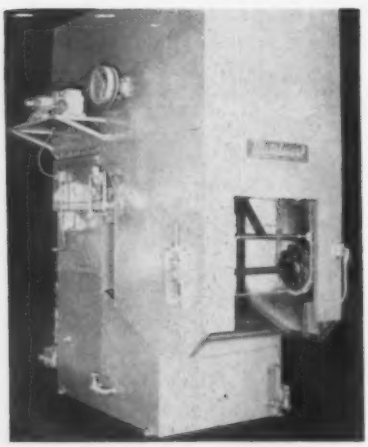
LINK-BELT

Ball and Roller Bearings

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 113 or 114.



Conveyorized degreaser removes polish from silver

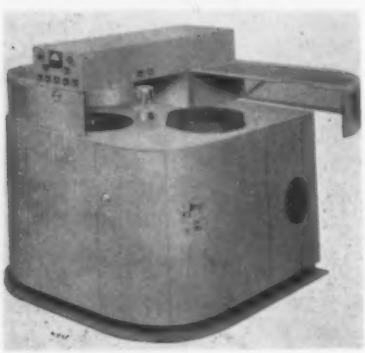
This conveyorized degreaser removes polishing compounds from sterling silver. Racks of work to be cleaned are conveyed into the degreaser, where they are subjected to a vapor cycle, a pressure spray cycle followed by a final vapor cycle and return to the operator clean and dry. Designed with an adjustable speed drive, it cleans over 1500 pieces hourly. Unit sprays filtered solvent and is equipped with a dual filter system, one filter in use with the other as a standby. This method enables the filter system to be serviced when convenient without need of turning off the degreaser. The degreaser is constructed of solid stainless steel, equipped with a recessed copper condensing coil and an all brass spray system. Special conveyor chain and internal bearings are said to practically eliminate need for lubrication, thus reducing maintenance. Use of a solvent recovery still in conjunction with the degreaser further reduces maintenance while maintaining efficiency. *Metalwash Machinery Corp.*

For more data circle No. 28 on postcard, p. 113

Special hose aids airless spray system development

In contrast to conventional sprayers which use compressed air as an atomizing force, a new hose assembly of fluorcarbon resin jacketed in stainless steel wire braid allows airless spraying. The new system uses pressures of 500 to 600 psi and temperatures of 160° to 180°F to hold solvents near the boiling point. When solvents in paints and lacquers are released to the atmosphere, they atomize instantly. The airless technique, through minimizing overspray, is reported to reduce coating material required by as much as 50 pct. Because of the high temperatures and pressures involved, an important design consideration was the hose used to carry hot, pressurized solvents from heating system to spray gun. High pressure pump sends material through hose to heating unit. Fluid pressures range from 300 psi for coating oils to 1200 psi for plastisols. Spray can be held within a few inches of the surface, since there is no rebound. *Resistoflex Corporation.*

For more data circle No. 29 on postcard, p. 113



Machine tests spin cut-off saws and grinding wheels

Design and production of a new automated spin test machine for cut-off saws and grinding wheels has been announced. They are used for one-at-a-time testing at controlled speeds up to 15,000 rpm. The units are presently being integrated into production lines to provide individual 100 pct tests of production runs. They are also being used for batch testing. Automatic load, spin and unloading is reported for the units. Acceleration and deceleration rates are said to be adjustable and smooth. Specially designed vacuum transfer arms handle porous as well as dense abrasive cut-off saws up to 20 in. in diam. Edges are reported undamaged. The machines operate only when safety housings are closed. Controls are grouped on front panel. *George L. Day Co.*

For more data circle No. 30 on postcard, p. 113

2,370 lb.

FERROUS

FORGING

CAMERON'S SPLIT-DIE FORGING PROCESS

makes possible a saving in machining time plus a better grain structure in this launching valve body. High quality alloy steel press-forgings with both internal and external contours are produced by Cameron in a great variety of sizes and shapes.

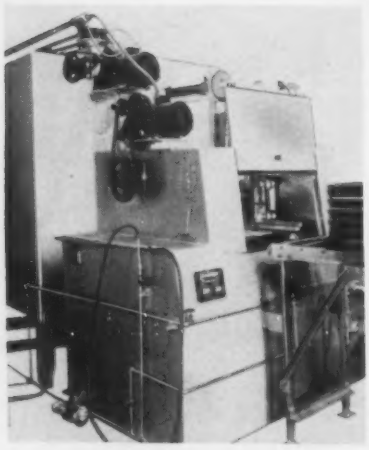
Weight in these forgings is from 200 to 5,000 lbs. but design possibilities of surface and mass have made such a break with past practice that often we are asked, "Is this a forging?"

For information about the unusual advantages of these unusual forgings, write or call . . . .

Cameron

IRON WORKS, Inc.

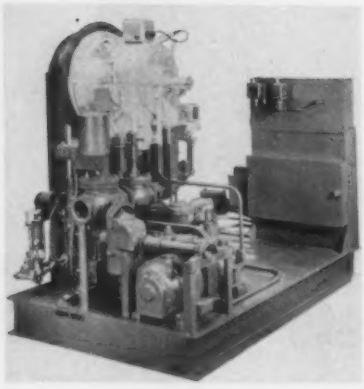
SPECIAL PRODUCTS DEPARTMENT
P. O. Box 1212, Houston, Texas



New controlled atmosphere furnace makes its debut

Originally designed for batch type operation of gas carburizing and carbonitriding, this recently introduced furnace may also be used for clean hardening, martempering and controlled atmosphere annealing. It is engineered to reduce the number of technically trained operators. Temperatures once set, are held uniform. The carbon potential is automatically maintained by a generator. It is available in both gas and electrically heated models. Each unit uses the radiant tube heating principle. A true recirculating high temperature fan and accurately controlled atmosphere are said to provide consistency. The new design reportedly minimizes down time and reputedly offers the lowest possible maintenance cost. Radiant tubes can be readily removed from the top of the furnace and the fan is easily exchanged as a complete assembly. Conveying equipment can be removed from the furnace's rear and all drives are accessible from the outside. *Industrial Furnace Div., Sunbeam Corp.*

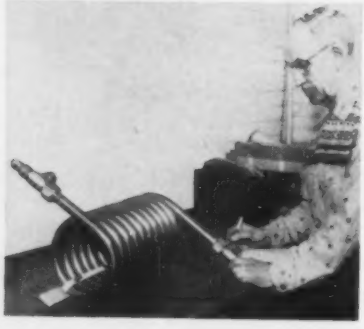
For more data circle No. 31 on postcard, p. 113



Combustion assemblies use gas, oil or gas-oil firing

Complete packaged combustion assemblies utilizing gas, oil or combination gas-oil are now available. They can be used for modernizing or converting existing boiler or processing equipment or for obtaining efficient operation from new boiler or processing installations. The fuel burning systems include burner, automatic controls, forced-draft air supply, full modulation firing control, ignition, complete piping and wiring and the refractory required for the burner throat. Complete flexibility permits use on furnaces, ovens, vats, kilns, dryers, boilers and numerous other types of industrial heat exchangers. Five sizes are available for firing rates from three million to 25 million Btu per hour. Burner features clean, efficient combustion and modulated firing over a wide range of loads, according to the manufacturer. *Orr & Semblower, Inc.*

For more data circle No. 32 on postcard, p. 113



Heat transfer coils cool liquids and gases

Dual heat transfer coils made by one manufacturer for cooling liquids and gases are described as giving an even cooling effect. This is assured, company says, due to construction of cold drawn Inconel and type 304 stainless steel Superior tubing. This tubing has uniform wall thickness and is said to be free of defects. It allows production of concentric coils (inner tubing centered inside outer tubing), permitting an even flow. Coil comes in three sizes: ¼, ⅜ and ½ in. diams with wall thicknesses of 0.049, 0.049 and 0.065 in. respectively. Copper external tube's OD is ½, ¾ and one in. For pressures below 1000 psi and temperatures below 700° F both coils are made from copper. *Parker Appliance Co.*

For more data circle No. 33 on postcard, p. 113

Grinder handles spur, right and left hand helical gears

External precision spur and both right and left hand helical gears from eight to 100 pitch are handled on a new model reciprocating precision gear grinding machine. A number of gears of the same type can be ground simultaneously from hardened steel in preformed or solid blanks or, gears can be ground individually. The grinding wheel (12 x 5 x ½ to 2 in.) is formed to the basic rack form by an automatic wheel dressing process. The gear blank or blanks are mounted in grinding position between head and tailstock centers. The grinding operation is similar to hobbing in that the work rotates continuously at a rate of speed synchronized with that of the grinding wheel. It occupies 103 x 132 in. floor space and is 71 in. high. *The Sheffield Corp.*

For more data circle No. 34 on postcard, p. 113

ELPAR®

ELPAR RAM TRUCKS

Offer You the Latest Design and the Most Modern Features, Including

...better operator vision
...narrowest overall width
...twin power plants
...power steering
...power wheel brakes

all these in the TOUGHEST Ram Trucks built!

See You at the

STEEL SHOW
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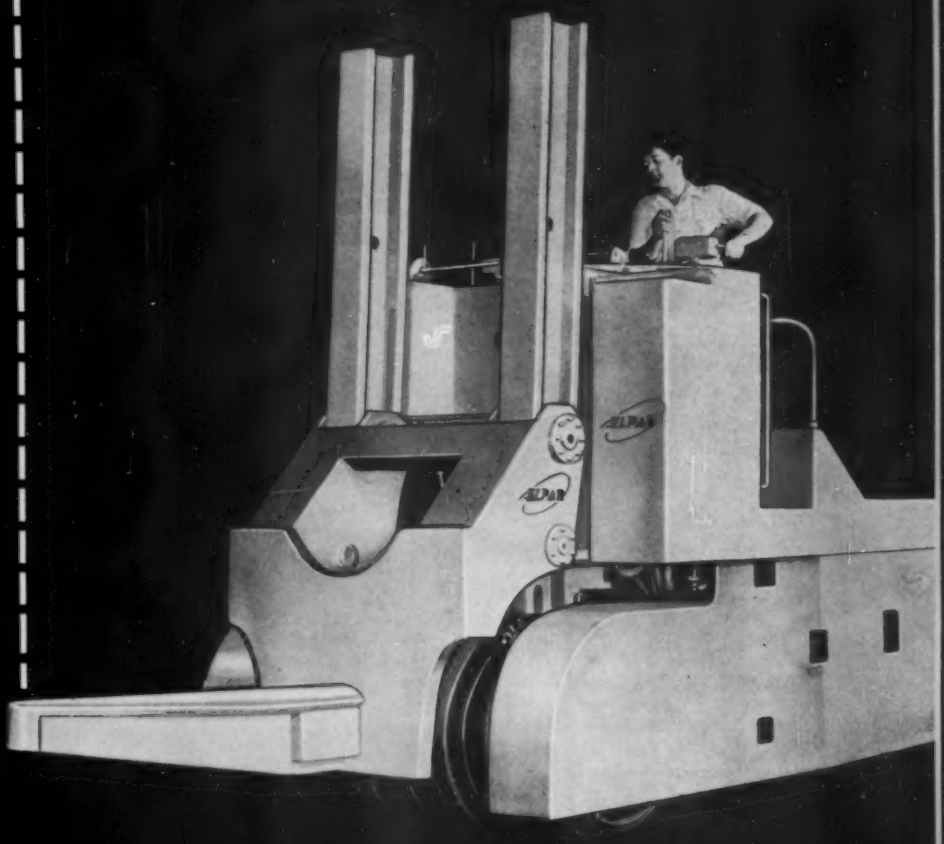
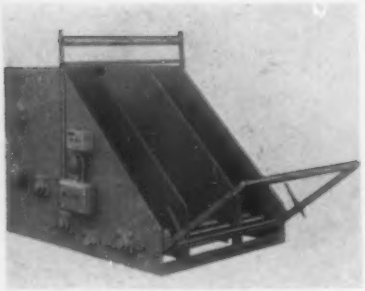


THE ELWELL-PARKER ELECTRIC CO., CLEVELAND 3, OHIO

Improved series handles coil stock from 1200 to 16,000 lb

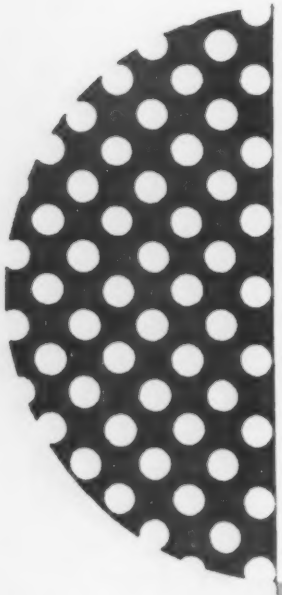


Handling coil stock up to 48 in. wide and 60 in. in diam, these units are capable of supplying and maintaining a slack loop from which any automatically fed machine can draw. They come in capacity ranges from 1200 lb coils to 16,000 lb coils. By pulling from the slack loop instead of against the weight of a heavy coil, automatic feeding devices are said to be far more accurate with considerably higher running speeds. Latest improvements include a new actuating linkage which increases versatility without attachments or accessories. The linkage is fully adjustable within a 90° arc and is designed to permit use either inside or outside of the slack loop. *Benchmaster Mfg. Co.*

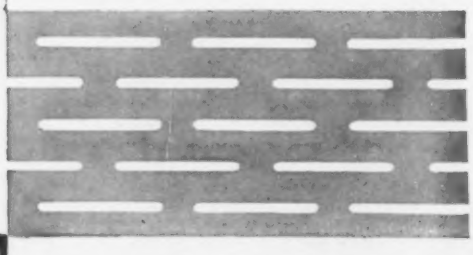
For more data circle No. 35 on postcard, p. 113

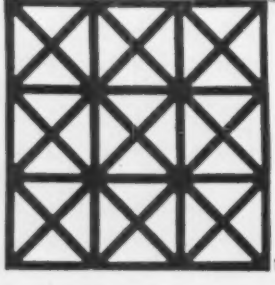
count on **WISSCO**

for every type of perforation



- All metals including stainless and carbon steel, monel, copper, brass, bronze and aluminum.
- Fabricating facilities include rolling, forming, shearing, welding and assembling.
- Material to be perforated can be supplied either by us or by your company.





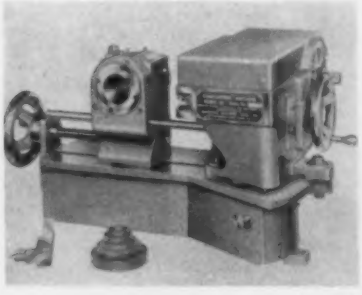
1986

WICKWIRE SPENCER STEEL DIVISION OF CF&I
Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans
New York • Philadelphia

WISSCO
PERFORATED METALS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION.

Graduating machines

Company has announced that its circular graduating machine for machine tool dials and hand wheels is now available. Relatively small and simple to operate, the circular



graduating machine will graduate straight or angled surfaces with from 40 to 1000 graduations with many combinations of length or line. *Abrasive Machine Tool Co.*

For more data circle No. 36 on postcard, p. 113

Automatic feeder

This automatic feeder is thought to have the largest hopper capacity of any model on the market. Its size is reported to offer several advantages: (1) it serves as a storage space for parts, (2) prevents floor cluttering with boxes of parts, and (3) feeds parts through multiple chutes to production machines, assembly lines, etc. Actually, says the maker, this model takes the place of several units with smaller hoppers. The range of work for rolling parts is five in. diam and 3/16 in. to 1½ in. long; for sliding parts from 3/16 to two in. diam and up to five in. long. *Feedall, Inc.*

For more data circle No. 37 on postcard, p. 113

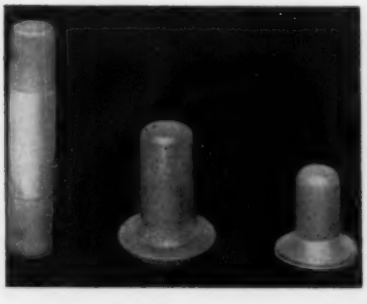
Silicone foam rubber material is developed

Silicone foam rubber has been developed. It is lightweight and remains soft and resilient over a temperature range of —100° to 480°F. Because of its interconnecting cell structure, it recovers shape instantly after being compressed for long periods at elevated temperatures. The material can be readily molded into complex shapes. Typical of silicone rubber, it is inert to ozone and weathering, nonsticking, non-corrosive, odorless, tasteless and exhibits excellent electrical properties. In applications requiring exceptional abrasion resistance, material can be covered with Dacron fabric or Teflon film. *Connecticut Hard Rubber Co.*

For more data circle No. 38 on postcard, p. 113

Self-seating rivets

Mass production of one type rivet fasteners which automatically seal themselves against fluid or air leaks without caulking or rubber sealing agents has begun. It attains its seal from a soft aluminum jacket around its shank which extrudes when the rivet is



expanded after driving. The seal is attained without use of caulking or rubber sealing agents. A washered-head rivet is used where sealing is required under the head of the rivet, only, and where sealing compounds are used between the attaching skin members. *Pastushin Aviation Corp.*

For more data circle No. 39 on postcard, p. 113

Refractory brick

Virtual elimination of metals contamination in reverberatory type furnaces is reported with a new high purity refractory brick. It is a 98 to 100 pct pure aluminum oxide special refractory that is easier to clean because it resists dross build-up. Field tests have shown it resists wetting by aluminum because of its purity. *Electro Refractories & Abrasives Co.*

For more data circle No. 40 on postcard, p. 113

STEEL MILL ROLLS
by
TITUSVILLE FORGE

ALL TYPES AND SIZES FORGED AND GROUND TO YOUR SPECIFICATIONS

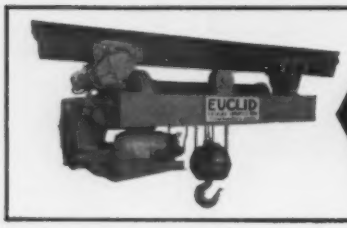
Plate rolls—bending rolls—back up rolls—straightening rolls—table rollers and other mill rolls are dependably forged and ground in any size—to any specification at Titusville Forge. Illustrated above is a straightening roll being ground on our 42" Landis Grinder. Size is 16" diameter x 28'3⅛" long, 40/45 scleriscope hardness.

Rely on Titusville Forge for rolls that meet your specific requirements.

Struthers Wells

STRUTHERS WELLS CORPORATION
TITUSVILLE FORGE DIVISION
TITUSVILLE, PA.
PLANTS AT TITUSVILLE, PA., and WARREN, PA.
Offices in Principal Cities

For HIGH LIFTS and *FAST TRAVEL* with HEAVY LOADS



Here is a typical monorail type, motorized trolley

EUCLID *TRAVELING* HOIST

It has a capacity of 15 tons and is equipped with a four part cable and a large drum to afford an unusually high lift.

Similar hoists are available in capacities up to 30 tons with geared or powered trolleys; with two hooks, if needed; also with push button, pendant or remote controls. Larger hoists may be had with operator cabs for inside or outside use.

Euclid's broad experience enables its engineers to design special types of grappling equipment for use with cranes or hoists. Counsel is available without obligation. Consult us.

THE EUCLID CRANE & HOIST CO.
1361 CHARDON ROAD • CLEVELAND 17, OHIO

WRITE FOR CRANE CATALOG

TO GET DEPENDABLE ACCURATE PROMPT METAL STAMPING SERVICE

"Old Hands" at cold forming in all metals.

Send for latest brochure or telephone
WESTBORO • • Mass. 2253 8236
CARLSTROM PRESSED METAL CO., INC.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

Automatic micrometer

With a new model digital read-out electronic micrometer the exact dimension of a part is determined minus the human error factor. Unlike ordinary micrometers, it features: (1) elimination of the human sense of touch in setting the instrument, (2) inexact or uncertain use of muscular power in positioning the work, and (3) intellectual effort (and error). An

electronic circuit responds instantly on contact between the micrometer anvil and the work before any pressure is built up on the work by the micrometer screw. A motor drive automatically brings micrometer precisely to point of contact at far faster than manual speed. Elimination of the "To err is human" factor in interpreting the relative position of a zero line and a calibrated scale into a decimal dimension is done with a digital read-out counter. *J. W. Dice Co.*

For more data circle No. 41 on postcard, p. 113

Lets operator see saw

Circular table saws, long considered one of the most dangerous of power tools, appear about tamed with a new type safety guard. Collaboration between safety men and a manufacturer has produced this new concept in safety devices for circular-saw tables. The guard does not get in the operator's way and allows him to see what he saws. Heavyweight transparent plastic shields the entire revolving saw. *Brett-Guard Co.*

For more data circle No. 42 on postcard, p. 113

Long life battery

Unlimited "shelf life" is reported of a new solid electrolyte battery. Designed for low-current applications, it weighs less than an ounce, and is made primarily of silver, silver iodide, and vanadium pentoxide. Laboratory tests indicate the battery should give up to several decades' continuous service in suitable applications, such as

maintaining a charge on capacitors in electronic circuits. Only ⅓ in. in diam and one in. long, it weighs but ¼ oz. and consists of 200 paper-thin cells. It is rated at 95v. A continuous current drain of ten micro-microamperes can be maintained, with flash currents in the microampere range. In service, the battery can withstand temperatures ranging from –70° to +170° F with no appreciable change in voltage, company says. It is a true solid state battery, not dependent upon liquids, gases, or vapors. *National Carbon Co.*

For more data circle No. 43 on postcard, p. 113

Multi-spindle head

Vertical single spindle drill presses may now play a double role as multi-spindle drill presses. A new unit is an automatic revolving and indexing multi-spindle drill head that takes two to seven tools at one time. All spindles are completely and quickly interchangeable. Ten independent speeds are available. All work spindles are provided with Morse and Jacobs tapers, and drilling and tapping chucks. *Jersey Mfg. Co.*

For more data circle No. 44 on postcard, p. 113

COWLES

TRIMMING KNIVES

produce more tonnage per grind

Cowles knives stay on the job longer. They keep mills in continuous production without downtime for knife changes. Manufactured from individually hammered forgings, and heat treated to assure maximum durability, they meet industry's most exacting requirements. Complete range of sizes. **Prompt delivery.** Widely used by all principal producers and processors. Let us quote on your requirements!

COWLES

TOOL COMPANY

2086 WEST 110th STREET

CLEVELAND 2, OHIO

Specializing in the Manufacture of

ROTARY SLITTING KNIVES • SPACING COLLARS • GANG TOOLS • EDGING ROLLS • CUT-OFF KNIVES • SEAM GUIDE ROLL FINS • SEAM GUIDES • WIRE DRAWING TOOLS • STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.

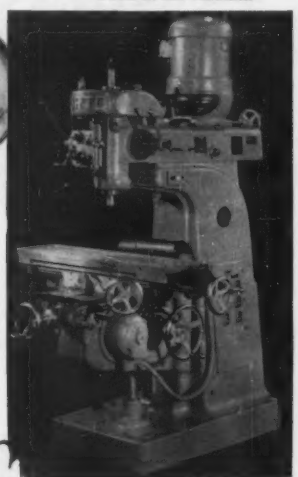
SAVE TIME and MONEY

with **Ruthman**

GUSHER

coolant pumps

This milling machine, manufactured by George Gorton Machine Company, is equipped with a Ruthman Gusher Coolant Pump in back of the column.



Operating and maintenance costs are reduced when you specify Gusher Coolant Pumps. You get split-second coolant flow . . . controllable as to volume. There is no priming or packing needed. Heavy-duty pre-lubricated ball bearings and electronically-balanced rotating shaft give you long life with minimum cost of maintenance. We will be glad to advise you on your coolant problems.

Model 5-P 3

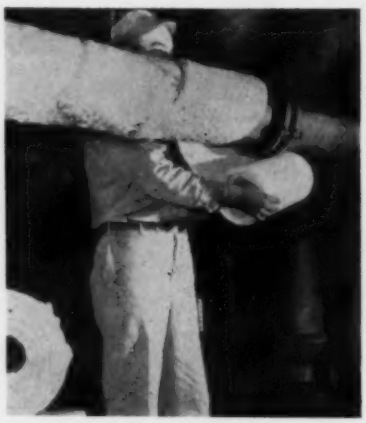
THE RUTHMAN MACHINERY CO.

1809-1823 READING RD. CINCINNATI 2, OHIO

Special Washers
ANY METAL • ANY SIZE
ANY QUANTITY
Over 15,000 Sets of tools at your disposal
THE Master Products CO.
6400 PARK AVENUE • Diamond 1-1740 • CLEVELAND 5, OHIO

Insulating blanket

This high temperature insulation blanket of ceramic fiber resists temperatures as high as 2300°F. Made of extremely fine, closely intertwining aluminum silicate fibers, blanket keeps its form and properties despite elevated temperatures, company says. Because of its insulating qualities, a high thermal gradient through a minimum thickness of blanket is reported. Where indicated other low temperature blankets may be used in combination to further reduce heat loss, maker says. Possessing high chemical stability, the blanket may be used as insulation lining in alloy and refractory furnaces without harm from the furnace atmosphere, according to the manufacturer. *The Carborundum Co.*



For more data circle No. 45 on postcard, p. 113

Mobile job recorder

Wherever battery power can be obtained, a practical on the job recorder can be operated. It is completely mobile and is recommended for use in field trucks, etc. Modern in design, it is ruggedly constructed with the company's "no-jam" type section. It can be readily adjusted to date and time with automatic ribbon feed and reverse. Two color registration allows easy tabulation. The recorder can be adapted to any style or size time card, job order form or service ticket. *Cincinnati Time Recorder Co.*

For more data circle No. 46 on postcard, p. 113

SPIRAL BEVEL GEAR

HYPOID PINION

How to produce both with just *one* cutter, *one* machine

These two parts alone show why the Unitool* Method is ideal for economical job shop operation, for trying new ratios, and for producing prototypes.

You need only one machine—either the No. 116 Hypoid Generator or the smaller No. 106—and one cutter to produce both parts.

You complete both parts from the solid before removing them from the machine.

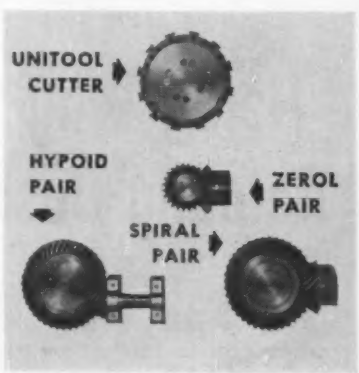
Add just five more cutters and you are equipped to produce spiral bevel and Zerol® bevel pairs of any ratio, and hypoid pairs of 3:1 ratio and higher. You can cut any of these gears up to 18″ pitch diameter.

*Trademark

No special training needed The operator uses direct common sense methods to set for the correct tooth thickness and position of contact. No lengthy, expensive training is necessary.

Fast change-overs You can switch to different sizes or types of gears in minutes. A calculated set-over is all it takes to get the right gear size. No other measurements are necessary.

Bulletins—Write for bulletins on the Unitool Method and the two generators which outline all the advantages of the method and explain its operation in detail.



With the Unitool Method you use just one cutter to produce the three types of gear pairs shown here. Such versatility cuts costs sharply on small-lot production.

GLEASON WORKS

Builders of bevel gear machinery for over 90 years

1000 UNIVERSITY AVE., ROCHESTER 3, N. Y.

Carbide tipped slab broaches.

Partial view of a conventional round hole broach. Roughing, semi-finishing and finishing teeth are shown.

This solid carbide finishing shell fits on an arbor of a conventional round broach.

Surface broach with adjustable and replaceable carbide tipped tool bits.

Here's Why Continental Quality Broaches Actually Cost Less Than Ordinary Broaches

Continental's experience in designing and manufacturing has broadened the use of broaching and has brought its advantages to applications that were normally considered impractical.

Continental engineers are tool specialists. Every tooth of a Continental broach is an effective cutting tool because of quality materials, skilled craftsmen and engineering experience.

Continental broaches are free cutting, hold required tolerances and finishes with maximum pieces per tool. That's why many manufacturers have learned to agree with Continental—*the best broaches cost less.*

Continental
TOOL WORKS
Division of
Ex-Cell-O Corporation
Detroit 32, Michigan

56-40

The Iron Age SUMMARY . . .

Influx of auto steel orders is due . . . Most fourth quarter space will be filled . . . Out of balance inventories a big headache . . . Hard-pressed users resist high priced imports.

Worst Is Ahead . . . Steel users will get the bad news in a few days when automotive companies come into the market with their orders for November. When full impact of fourth quarter automotive production schedules is felt, the already tight market will snap shut like a vise.

It won't be news to users of plates, structurals and oil country goods. But some slowness on the part of auto companies to commit themselves fully on 1957 model schedules has led to an artificial feeling of plenty in a few other products.

Tipoff is a recent and sudden tightening of forging bars and billets and a quick pickup in demand for manufacturers' wire from auto parts suppliers who have already received their orders for the new models.

Up to now, mills have generally left space open for November and December automotive orders. But when the word is out from Detroit, books (for all intents and purposes) will be filled for the rest of 1956 for most products.

Out of Balance . . . Big problem causing steel consumer anxiety is the out-of-balance situation of their inventories. While cold-rolled sheets were momentarily easy during the automotive model changeover period, hot-rolled sheets have become as tight as any product.

Steel users going into the fourth quarter with well-balanced inventories may be able to survive the winter squeeze without too much trouble. Those who are short on some products now are in for it. There isn't enough to go around.

Some manufacturers who are heavy plate users have had to cut work-weeks because of unavailability of plates. Foreign steel and conversion is a factor, but importers and arrangers of conversion deals are finding more price resistance than is usual in a tight market.

Problems at the Mills . . . The steel industry is doing its best to meet the demand, but has its own problems. In other post-strike periods, the operating rate bounced back to well over 100 pct of capacity. This year the industry has had trouble bouncing back.

The reason: maintenance and repair troubles, at the steel furnaces, at the blast furnaces and on the rolling mills. This has added to the problems of recovering from the strike, which had the effect of 6 to 8 weeks' loss of production.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,462	2,437	2,154	2,316
Ingot Index (1947-1949=100)	153.3	151.7	134.1	144.0
Operating Rates				
Chicago	100.0	101.0*	87.0	97.5
Pittsburgh	100.0	98.0*	91.0	97.0
Philadelphia	103.0	105.0	77.0	98.0
Valley	97.0	95.0	73.0	96.0
West	100.0	98.0*	92.0	93.0
Detroit	100.0	97.0	80.0	94.0
Buffalo	108.0	107.0	95.0	105.0
Cleveland	107.0	99.0*	97.5	100.0
Birmingham	96.0	93.0	60.0	96.0
S. Ohio River	91.0	90.0*	86.0	87.0
Upper Ohio R.	101.0	99.0*	96.0	100.0
St. Louis	96.0	95.0	102.0	106.0
Northeast	100.0	100.0	55.0	96.0
Aggregate	100.0	99.0	87.5	96.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.622	5.622	5.622*	5.174
Pig Iron (Gross Ton)	$63.04	$63.04	$63.15	$59.09
Scrap, No. 1 hvy (gross ton)	$58.83	$58.50	$56.83	$44.17
Nonferrous				
Aluminum ingot	27.10	27.10	25.90	23.20
Copper, electrolytic	40.00	40.00	40.00	43.00
Lead, St. Louis	15.80	15.80	15.80	12.50
Magnesium ingot	36.00	36.00*	36.00*	29.25
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	101.25	99.875	98.625	96.75
Zinc, E. St. Louis	13.50	13.50	13.50	12.50

*Revised

Plate Supply Critically Tight

Shortage causes fabricator to cut workweek . . . Foreign product is available, but prices are very high . . . U. S. Steel announces price increase on tin, black and terne plate.

◆ PLATE SHORTAGE has reached the critical stage. It's caused one Midwest tank fabricator to cutback the company's workweek to only four days.

Purchase of a foreign product isn't a satisfactory answer either, although it was available. The same company found these prices double those of domestic mills. Not able to absorb such cost increases or pass them on to customers, the fabricator had to stay out of the market and had to reduce the work week.

Tight supply situation in plate has other effects. Fabricators and other users are understandably reluctant to tie up money in other products when the basic plate and structurals they need are not obtainable. There is also some evidence of tie-in sales where warehouses with plate on hand can attract large orders for other products by using the plate as bait.

Midwest brokers are doing business in domestic plate at up to $340 a ton as compared with regular prices of $165.

News of price increases this week included:

U. S. Steel Corp. and its operating divisions, Columbia-Geneva Steel Div. and Tennessee Coal & Iron Div., raised mill price bases for electrolytic and hot-dipped tin plate, black plate and terne plate for the period Nov. 1 through April 29, 1957. The new price bases represent an increase of 10¢ per base box.

Keokuk Electro-Metals Co. increased electric furnace silvery pig iron by $5.00 per gross ton.

Vacuum Metals Corp. announced price increases representing, in general, a raise of about 8 pct on vacuum melted steel and superalloys. The increases are effective Sept. 6. There were corresponding increases in extras.

Base price of wrought and cast beryllium copper alloys were increased 4 to 5 cents a lb effective Sept. 4 by The Beryllium Corp. The increase represents a 2 pct rise in the current selling price of beryllium copper strip, rod, wire, and billets. It means a 3 pct raise in the current price of beryllium copper casting ingots.

Climax Molybdenum Co. announced that average molybdenum-base alloy prices were reduced by approximately 30 pct, while pure metallic molybdenum prices were increased on an average of about 20 pct. Under the new price schedule, effective Sept. 1, the base price of molybdenum alloy extruded ingots containing 0.5 pct titanium is $10.60 per lb, f.o.b., Detroit. Pure metallic molybdenum extruded ingots are priced at $9.60 per lb, f.o.b., Detroit. Prices of other forms are comparably affected.

PLATE AND STRUCTURALS. . . . Situation at **Pittsburgh** is bad. Contractors say they are being quoted one year delivery for large orders of structural steel. An equipment maker has been walking the supply tightrope by building up plates to take the place of missing structurals. One bright spot is news that one producer says third quarter plate commitments will be met on the basis of a six weeks delay. It's possible because bookings were kept to normal limits and plate orders are not yet being crowded off strip mills.

At **Cleveland**, plates and structurals continue sold out for as long ahead as orders are being taken.

Chicago area mills are concentrating more attention on plate and structural production as these items, along with pipe and tubing, are in shortest supply. Gray markets in plate and structurals are reported flourishing at **Detroit**. Mills there could easily be booked up solid on these products through the end of 1957.

SHEET AND STRIP . . . **Cleveland** area sheet producers feel the fourth quarter outlook is still somewhat in doubt until automakers place their November tonnage orders. Most are holding rolling time open for the auto makers and taking a minimum of orders.

At **Chicago**, there has been a noted pickup in the demand for hot-rolled sheet. Predictions for a very tight supply situation are based on the fact that automakers are expected to come into the sheet market strongly in October for their 1957 models. At the warehouse level the demand for hot-rolled sheets has started to pick up somewhat. In **Detroit** there are indications that automakers will come into the market soon.

Grand Larceny

Attempted king-size pilfering was foiled at the Brackenridge Works of Allegheny Ludlum Steel when company personnel recovered a stainless steel ingot weighing 9600 lb from a dumping ground.

Evidence indicated that transport of the steel to the dump was the initial move in a theft plot that went awry. The culprit wasn't as foolish as it might appear. The ingot of chromium-nickel steel was large enough to make over 1000 automobile hub caps or to cover the front of a new building 90 ft wide and 20 stories high.

Because of the material's corrosion resistance it could have remained hidden, in plain sight on the dump, for a lifetime without rusting.

Purchasing Agent's Checklist

CONTROLS: U. S. tungsten stockpile program hit ..... p. 53

BUSINESS: Steel's big supply problems still to come ..... p. 54

MARKETING: Tractor industry faces sales slump ..... p. 58

WASHINGTON: Capital looks for steel price hikes ..... p. 73

Comparison of Prices

(Effective Sept. 11, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 11 1956	Sept. 4 1956	Aug. 14 1956	Sept. 13 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675*	4.325
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	47.50	47.50	47.50	42.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.85	$9.85	$9.85	$9.05
Tinplates, electro (0.50 lb.)	8.55	8.55	8.55	7.75
Special coated mfg. ternes	9.10	9.10	9.10	7.85
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	40.75	40.75	40.75	38.25
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
Rails: (per 100 lb.)				
Heavy rails	$5.075	$5.075	$5.075	$4.725
Light rails	6.00	6.00	6.00	5.65
Semifinish Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225
Finished Steel Composite: (per pound)				
Base price	5.622¢	5.622¢	5.622¢*	5.174¢

	Sept. 11 1956	Sept. 4 1956	Aug. 14 1956	Sept. 13 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$67.76	$67.76	$67.76	$63.69
Foundry, Valley	63.00	63.00	63.00	59.00
Foundry, Southern Cin'ti	67.17	67.17	66.93	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	63.00	63.00	63.00	59.00
Basic del'd Philadelphia	66.84	66.84	66.98	62.77
Basic, Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb‡ 74 to 76 pct Mn base.	10.75¢	10.75¢	10.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$63.04	$63.04	$63.15	$59.09
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$58.50	$58.50	$57.50	$44.50
No. 1 steel, Phila. area	58.50	58.50	56.50	46.50
No. 1 steel, Chicago	59.50	58.50	56.50	41.50
No. 1 bundles, Detroit	56.50	55.50	54.50	39.00
Low phos., Youngstown	66.50	65.50	65.50	47.50
No. 1 mach'y cast, Pittsburgh	60.50	60.50	60.50	45.50
No. 1 mach'y cast, Philadel'a	58.00	58.00	57.50	47.50
No. 1 mach'y cast, Chicago	59.50	59.50	59.50	52.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$58.83	$58.50	$56.83	$44.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.50	$14.50	$13.25
Foundry coke, prompt	$17-18	$17-18	17.50	16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	40.00	40.00	40.00	43.00
Copper, Lake, Conn.	40.00	40.00	40.00	40.00
Tin, Straits, New York	101.25†	99.875	98.625	96.75
Zinc, East St. Louis	13.50	13.50	13.50	12.50
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	27.10	27.10	25.90	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	36.00	36.00*	36.00*	29.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and stripe.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on p. 152→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B1*	64.50	65.00	65.50	66.00	.....
Birdsboro, Pa. *B6*	64.50	65.00	65.50	66.00	.....
Birmingham *R3*	58.50	59.00	.....	.....	.....
Birmingham *W9*	58.50	59.00	63.00	.....	.....
Birmingham *U4*	58.50	59.00	63.00	.....	.....
Buffalo *R3*	62.50	63.00	63.50	64.00	.....
Buffalo *H1*	62.50	63.00	63.50	.....	.....
Buffalo *W6*	62.50	63.00	63.50	64.00	.....
Chester *P2*	64.50	65.00	65.50	.....	.....
Chicago *I4*	62.50	63.00	63.00	63.50	.....
Cleveland *A5*	62.50	63.00	63.00	63.50	67.50†
Cleveland *R3*	62.50	63.00	63.00	63.50	.....
Duluth *I4*	62.50	63.00	63.00	63.50	67.50†
Erie *I4*	62.50	63.00	63.00	63.50	67.50†
Everett *M6*	.....	63.75	64.25	.....	.....
Fontana *K1*	70.00	70.50	.....	.....	.....
Geneva, Utah *C7*	62.50	63.00	.....	.....	.....
Granite City *G2*	64.40	64.90	65.40	.....	.....
Hubbard *Y1*	.....	.....	63.00	.....	.....
Midland *C11*	62.50	.....	.....	.....	.....
Minnequa *C6*	64.50	65.00	65.50	.....	.....
Monessen *P6*	62.50	.....	.....	.....	.....
Neville Is. *P4*	62.50	63.00	63.00	63.50	67.50†
N. Tonawanda *T1*	.....	63.00	63.50	64.00	.....
Pittsburgh *U1*	62.50	.....	63.00	63.50	.....
Sharpsville *S3*	62.50	63.00	63.00	63.50	.....
So. Chicago *R3*	62.50	63.00	63.00	.....	.....
Steelton *B3*	64.50	65.00	65.50	66.00	70.50
Swedeland *A2*	64.50	65.00	65.50	65.50	.....
Toledo *I4*	62.50	63.00	63.00	63.50	.....
Troy, N. Y. *R3*	64.50	65.00	65.50	66.00	70.50
Youngstown *Y1*	.....	.....	63.00	63.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31-0.49 pct phos. † Intermediate low phos.

Silvery Iron: Buffalo, *H1*, $72.50; Jackson, *I1, I4* (Globe Dir.), $71.50; Niagara Falls (15.01-15.50), $99.50; Keokuk (14.01-14.50), $102.00; (15.51-16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon: $64.00.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	19.75	21.00	20.50	22.00	—	23.25	35.25	28.25	32.75	—	16.00	27.75	16.25
Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00	—	20.75	—	21.00
Billets, forging	—	33.00	33.75	34.00	37.00	36.00	56.25	42.25	50.25	30.75	27.25	27.75	27.75
Bars, struct.	39.00	39.25	40.50	40.75	43.75	43.00	66.75	50.25	59.00	36.25	32.50	33.00	33.00
Plates	—	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	33.75	35.50	34.50
Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Strip, hot-rolled	33.00	35.75	34.00	36.75	—	39.75	63.50	48.75	58.25	—	29.75	—	30.75
Strip, cold-rolled	41.50	45.25	43.75	47.50	52.00	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	37.25	38.50	38.75	41.75	41.00	63.75	48.00	56.25	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (.25 per lb higher); New Bedford, Mass., *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa. *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y. *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7.* Dunkirk, *A3* (.25¢ per lb lower on Types 301, 303 and 316); Monessen, *P1;* Syracuse, *C11* (.25¢ per lb lower on Type 301, 304, and 304); Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

Scrap May Be Near the Top

Although prices set new records, some levelling off is noted . . . Strength continues in Midwest . . . Coast export to Japan creates cast shortage . . . Foundrymen protest.

◆ IT LOOKS LIKE the market might be approaching the long-looked-for leveling off period after weeks of record topping prices.

Several large districts, notably Pittsburgh and Philadelphia, held the price line on most grades and contributed much to the trend toward stabilization.

Other districts reported increases in No. 1 heavy melting of from $1 to $4 in what may be the final jockeying to get prices in line with the major districts. In Chicago, however, the primary steelmaking grade rose $1 to $60, sending THE IRON AGE composite up to a new high of $58.83.

Openhearth grades are starting to move in Pittsburgh and at least one item, railroad specialties, was going for last month's prices. Meanwhile, demand by foreign buyers added pressure to the market in New York and on the West Coast.

In fact, a hassle is expected to develop in Los Angeles and Washington, D. C., over West Coast scrap exports. Three Los Angeles foundries are shut down for lack of scrap cast iron, which reportedly is being diverted to fill large export orders to Japan.

Dealers also are saying they are unable to buy industrial scrap against the inflated prices being offered by brokers for export. Conferences are being held this week in Washington by the Dept. of Commerce and representatives of West Coast industries.

Pittsburgh . . . There are signs that the market here may have reached a turning point. Openhearth grades are moving more freely from dealers although not in great quantities and not at reduced prices. Area mills have been able to buy short turnings at $43 and low phos at $68, despite reports of greater strength in these grades. An early railroad list saw No. 1 railroad heavy melting and railroad specialties going for last month's prices. On the other hand, random length rails and 2 ft rails moved up sharply on the same list. Feeling seems to be that the mills will wait for lower prices before buying openhearth scrap.

Chicago . . . A large consumer came into the market this week and bought No. 1 industrial heavy melting at $62. The same mill purchased No. 1 factory bundles and low phos punchings and plate at $65. The market continues to reflect a growing amount of strength. Dealers and brokers feel the trend will continue with the market maintaining its present level or even going higher.

Philadelphia . . . Market is still firm, but prices may be at the ceiling. Primary factor is the fact that one of the areas big mills has been able to stay off the market. There have been some representative transactions at current levels and it looks like these prices will hold. Export continues to be a bigger factor than usual, but there is some indication of weakening here also.

New York . . . Pressure for higher prices continues unabated in this area. Significant new orders have not yet come through, but dealers and brokers are positive that new business must be $1 higher. They point to continued export demand, slow collections and depletion of yard stocks by recent orders.

Detroit . . . Prices advanced from $1 to $2 this week on the basis of a local mill buy. No. 1 heavy melting was quoted at $56 with No. 1 bundles $1 higher. The same mill bought No. 2 bundles at f.o.b. price of $38. Predictions are that the market now has reached a crest and will gradually lose its steam through the rest of the month.

Cleveland . . . Valley market moved up $1 to $66 for No. 1 heavy melting on orders by two mills. Small purchase of about 1000 tons of No. 2 heavy melting at $51 and No. 2 bundles at $47 was also made by another mill. Overall tone of the market remains firm with no big changes expected in the near future. Scrap generation at one auto plant next month is expected to be 55 pct above September.

Birmingham . . . All categories of the scrap market are strong in this district but trading has been quiet. One major openhearth consumer is holding up shipments on undelivered scrap purchased last month because of heavy receipts and some construction work at the site. There was some activity in electric furnace and cast grades at unchanged prices. With the large area mills out of the market, most openhearth scrap is moving for export or to northern markets.

St. Louis . . . Labor Day holiday caused a slight slump in receipts of scrap as compared to the preceding week, but it is expected that the movement will be stimulated by recent price advances. No. 1 bundles are up $3 in line with prices in Chicago. Shoveling turnings and unstripped motor blocks are up $1.

Cincinnati . . . A local mill came into the market for the second time this month at 50¢ per ton over the latest price. The mill paid $60 for No. 1 heavy melting delivered, $50 for No. 2 heavy melting and $47 for No. 2 bundles, helping to stabilize the local market. Some railroad scrap was sold in the area for more than $66. Some No. 2 bundles also are going up-river to Pittsburgh for $46.

Buffalo . . . The market continues firm here with no big sales reported. However, there were some small sales of openhearth grades at $58 to $59. Very small sales of No. 2 steel were made at $45 to $46, but they were too small to set a pattern.

Boston . . . Export and domestic markets were busy with eastern Pennsylvania mills very active in buying here. Primary grades held firm, but there was some weakening in the turnings market.

West Coast . . . Los Angeles prices moved up to match San Francisco levels. Mills, now back to almost 100 pct operating rate, are competing with hot-paced export business.

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Scrap Prices *(Effective Sept. 11, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$58.00 to $59.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 bundles	58.00 to 59.00
No. 2 bundles	47.00 to 48.00
Machine shop turn.	38.00 to 39.00
Mixed bor. and ms. turn.	38.00 to 39.00
Shoveling turnings	42.00 to 43.00
Cast iron borings	42.00 to 43.00
Low phos. punch'gs plate	67.00 to 68.00
Heavy turnings	54.00 to 55.00
No. 1 RR hvy. melting	67.00 to 68.00
Scrap rails, random lgth	77.00 to 78.00
Rails 2 ft and under	81.00 to 82.00
RR. steel wheels	73.00 to 74.00
RR. spring steel	73.00 to 74.00
RR. couplers and knuckles	73.00 to 74.00
No. 1 machinery cast	60.00 to 61.00
Cupola cast	53.00 to 54.00
Heavy breakable cast	51.00 to 52.00

Chicago

No. 1 hvy. melting	$59.00 to $60.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 factory bundles	64.00 to 65.00
No. 1 dealers' bundles	58.00 to 59.00
No. 2 dealers' bundles	44.00 to 45.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	38.00 to 39.00
Shoveling turnings	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Low phos. forge crops	72.00 to 73.00
Low phos. punch'gs plate	64.00 to 65.00
Low phos. 3 ft and under	67.00 to 68.00
No. 1 RR. hvy. melting	64.00 to 65.00
Scrap rails, random lgth	74.00 to 75.00
Rerolling rails	85.00 to 86.00
Rails 2 ft and under	83.00 to 84.00
Locomotive tires, cut	69.00 to 70.00
Cut bolsters & side frames	69.00 to 70.00
Angles and splice bars	74.00 to 75.00
RR. steel car axles	88.00 to 89.00
RR. couplers and knuckles	68.00 to 69.00
No. 1 machine cast	59.00 to 60.00
Cupola cast	55.00 to 56.00
Heavy breakable cast	48.00 to 50.00
Cast iron brake shoe	49.00 to 50.00
Cast iron wheel	60.00 to 61.00
Malleable	72.00 to 73.00
Stove plate	50.00 to 51.00
Steel car wheels	69.00 to 70.00

Philadelphia Area

No. 1 hvy. melting	$58.00 to $59.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 bundles	58.00 to 59.00
No. 2 bundles	47.00 to 48.00
Machine shop turn.	40.00 to 41.00
Mixed bor. short turn.	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Shoveling turnings	44.00 to 45.00
Clean cast chem. borings	45.00 to 46.00
Low phos. 5 ft and under	61.00 to 62.00
Low phos. 2 ft and under	62.00 to 63.00
Low phos. punch'gs	62.00 to 63.00
Elec. furnace bundles	60.00 to 61.00
Heavy turnings	54.00 to 55.00
RR. steel wheels	67.00 to 68.00
RR. spring steel	67.00 to 68.00
Rails 18 in. and under	74.00 to 75.00
Cupola cast	55.00 to 56.00
Heavy breakable cast	55.00 to 56.00
Cast iron car wheels	64.00 to 65.00
Malleable	68.00 to 69.00
Unstripped motor blocks	35.00 to 36.00
No. 1 machinery cast	57.00 to 59.00

Cleveland

No. 1 hvy. melting	$62.50 to $63.50
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	62.50 to 63.50
No. 2 bundles	40.00 to 41.00
No. 1 busheling	62.50 to 63.50
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	38.50 to 39.50
Shoveling turnings	38.50 to 39.50
Cast iron borings	38.50 to 39.50
Cut struct'r'l & plates, 2 ft & under	65.00 to 66.00
Drop forge flashings	62.50 to 63.50
Low phos. punch'gs, plate	63.50 to 64.50
Foundry steel, 2 ft & under	56.00 to 57.00
No. 1 RR. heavy melting	66.00 to 67.00
Rails 2 ft and under	80.00 to 81.00
Rails 18 in. and under	81.00 to 82.00
Railroad grate bars	47.00 to 48.00
Steel axle turnings	44.00 to 45.00
Railroad cast	60.00 to 61.00
No. 1 machinery cast	57.00 to 58.00
Stove plate	54.00 to 55.00
Malleable	70.00 to 71.00

Youngstown

No. 1 hvy. melting	$65.00 to $66.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 bundles	65.00 to 66.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Low phos. plate	66.00 to 67.00

Buffalo

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 busheling	54.00 to 55.00
No. 1 bundles	54.00 to 55.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	32.00 to 33.00
Low phos. plate	59.00 to 60.00
Scrap rails, random lgth	57.00 to 58.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	62.00 to 63.00
No. 1 machinery cast	52.00 to 53.00
No. 1 cupola cast	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$55.00 to $56.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles, openhearth	56.00 to 57.00
No. 2 bundles	37.00 to 38.00
New busheling	55.00 to 56.00
Drop forge flashings	54.50 to 55.50
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. punch'gs, plate	55.00 to 56.00
No. 1 cupola cast	51.00 to 52.00
Heavy breakable cast	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast	54.00 to 55.00

St. Louis

No. 1 hvy. melting	$55.00 to $56.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	53.00 to 54.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	36.00 to 37.00
Cast iron borings	37.00 to 38.00
Shoveling turnings	38.00 to 39.00
No. 1 RR. hvy. melting	62.50 to 63.50
Rails, random lengths	75.00 to 76.00
Rails 18 in. and under	79.00 to 80.00
Locomotive tires uncut	65.00 to 66.00
Angles and splice bars	68.00 to 69.00
Std. steel car axles	80.00 to 81.00
RR. specialties	68.00 to 69.00
Cupola cast	54.00 to 55.00
Heavy breakable cast	45.00 to 46.00
Cast iron brake shoes	50.00 to 51.00
Stove plate	48.00 to 49.00
Cast iron car wheels	55.00 to 56.00
Rerolling rails	82.00 to 83.00
Unstripped motor blocks	45.00 to 46.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$50.50 to $51.50
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	50.50 to 51.50
No. 2 bundles	37.00 to 38.00
No. 1 busheling	49.50 to 50.50
Elec. furnace, 3 ft & under	53.00 to 54.00
Machine shop turn.	28.50 to 29.50
Mixed bor. and short turn.	28.50 to 29.50
Shoveling turnings	34.00 to 34.50
Clean cast chem. borings	34.00 to 35.00
No. 1 machinery cast	45.00 to 46.00
Mixed cupola cast	41.00 to 42.00
Heavy breakable cast	44.00 to 45.00
Stove plate	39.00 to 40.00
Unstripped motor blocks	32.00 to 33.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	44.00 to 45.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	37.00 to 38.00
Clean cast chem. borings	35.00 to 36.00
No. 1 machinery cast	52.00 to 53.00
Mixed yard cast	48.00 to 49.00
Charging box cast	48.00 to 49.00
Heavy breakable cast	48.00 to 49.00
Unstripped motor blocks	38.00 to 39.00

Birmingham

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	25.00 to 26.00
Electric furnace bundles	51.00 to 52.00
Bar crops and plate	57.00 to 58.00
Structural and plate, 2 ft	56.00 to 57.00
No. 1 RR. hvy. melting	50.00 to 51.00
Scrap rails, random lgth	65.00 to 66.00
Rails, 18 in. and under	71.00 to 72.00
Angles & splice bars	64.00 to 65.00
Rerolling rails	71.00 to 72.00
No. 1 cupola cast	51.00 to 52.00
Stove plate	49.00 to 50.00
Charging box cast	40.00 to 41.00
Cast iron car wheels	43.00 to 44.00
Unstripped motor blocks	44.00 to 45.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	57.00 to 58.00
No. 2 bundles	44.00 to 45.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	39.00 to 40.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	39.00 to 40.00
Low phos. 18 in. & under	62.00 to 63.00
Rails, random lengths	68.00 to 69.00
Rails, 18 in. and under	76.00 to 77.00
No. 1 cupola cast	47.00 to 48.00
Hvy. breakable cast	47.00 to 48.00
Drop broken cast	58.00 to 59.00

San Francisco

No. 1 hvy. melting	$50.00
No. 2 hvy melting	47.00
No. 1 bundles	48.00
No. 2 bundles	42.00
No. 3 bundles	29.00
Machine shop turn.	30.00
Cast iron borings	30.00
No. 1 RR. hvy. melting	50.00
No. 1 cupola cast	55.00

Los Angeles

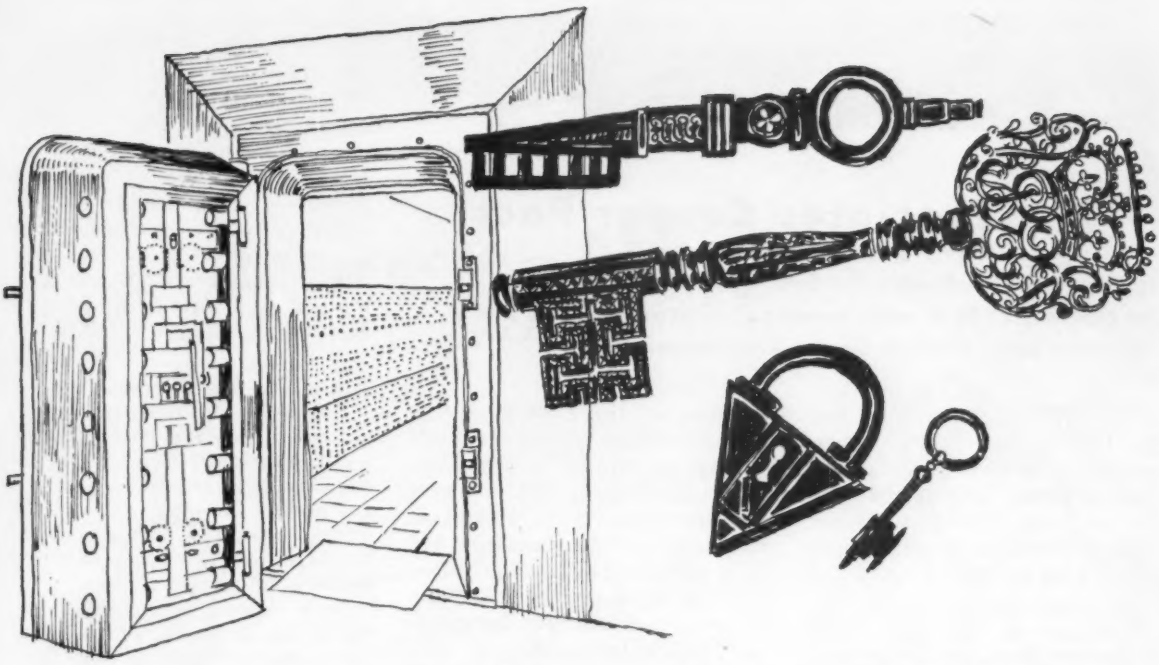
No. 1 hvy. melting	$50.00
No. 2 hvy. melting	47.00
No. 1 bundles	48.00
No. 2 bundles	40.00
No. 3 bundles	30.00
Machine shop turn.	30.00
Shoveling turnings	33.00
Cast iron borings	30.00
Elec. furn. 1 ft and under	51.00
No. 1 RR. hvy. melting	50.00
No. 1 cupola cast	52.00

Seattle

No. 1 hvy. melting	$50.00
No. 2 hvy. melting	46.00
No. 2 bundles	31.00
No. 3 bundles	27.00
No. 1 cupola cast	48.00
Mixed yard cast	48.00

Hamilton, Ont.

No. 1 hvy. melting	$52.00
No. 2 hvy. melting	47.00
No. 1 bundles	52.00
No. 2 bundles	42.50
Mixed steel scrap	46.00
Bushelings	39.50
Bush., new fact., prep'd	50.00
Bush., new fact., unprep'd	46.00
Machine shop turn.	28.00
Short steel turn.	34.00
Mixed bor. and turn.	28.00
Rails, rerolling	60.00
Cast scrap	50.00



symbol of the wife's authority

Soon after the human race started to acquire property, it began to devise safeguards for protecting its worldly goods. Some 4000 years ago, the Egyptians constructed a lock, the principles of which are still in use today. In Greece according to an old description, keys were "the shape of a sickle and . . . on account of their inconvenient form they were carried on the shoulder." Among the Romans, keys were regarded as the "symbol of the wife's authority in her husband's household."

Through ages of development, bolts, bars and locks have been made of wood, bronze and steel—with keys of appropriate size and construction.

Today's keys symbolize not only the wife's authority, but also the family's security. For innumerable locks, safes and vaults, and thousands of other civilian and military needs, an unfailing supply of steel must be maintained . . . And scrap is an indispensable ingredient.

For the purchase or sale of iron or steel scrap . . .

phone or write "Your Chicago Broker"

M. S. KAPLAN COMPANY

231 S. LaSalle St., Chicago

Telephone ANdover 3-3900

USW Negotiates Copper Pact

Settlement at Kennecott's Garfield refinery will cost the company 27.8¢ in wage increases . . . Reported to be 2.6¢ more than Mine, Mill and Smelter's settlement.

◆ KENNECOTT Copper Corp. and the United Steelworkers, representing workers at the Garfield, Utah, refinery, have agreed on a new contract. This means peace in the domestic copper producing industry for the next 3 years.

But when it comes time for the next confab in 1959 there could be some lively fireworks. Terms of the settlement are the cause.

Initially, the contract runs for the unusual period of 2 years 11 months. This means that it will expire the same time as the USW contracts in the Aluminum industry, and within a month of the expiration date of the USW-steel industry pacts.

The word from Garfield is that the local union officers favored a 3 year term. That would give them a month after aluminum contract expiration, and 2 months after steel industry. This would provide an established pattern to follow. The national union executive board overruled them. It appears to be a move on the part of USW to tighten up contract expiration dates. The implications will have to wait 3 years for clarification. This expiration date of July 31 is still one month later than contracts with workers represented by Mine, Mill & Smelter Union.

Terms of the USW-Kennecott settlement were slightly more advantageous to the union than those agreed on by MM&S, which represents most of the workers in the industry. Wage increases for USW workers total 27.8¢ per hour over the three year period. Base increases are 10¢ per hour the first year, 7¢ the second year, and 7¢ the last year—plus 3.8¢ per hour over the length of the contract as job classification increments. The MM&S pact was reported to be 2.6¢ lower than this by a Kennecott representative.

Total cost of the new USW contract is 33.75¢. It includes a new pension program to take effect Sept. 1, 1957; improved health and welfare benefits, double time and a half for holidays; and jury duty pay.

USW represents only a small segment of the copper industry. MM&S is the big union. However, it is no secret that USW has been taking dead aim on replacing MM&S. Because of the bad publicity for MM&S in 1956 (branding by Attorney General Brownell as riddled with reds, and conviction of its former president for perjury when he denied any communist affiliation) USW had figured maybe this was the year. It wasn't, but the issue isn't dead.

The fact that it landed bigger benefits will be a big gun for the next fray. But according to law there can't be a pitched battle during the length of a contract. MM&S has 3 years in which to retrench and put together ammunition to combat the assault that is sure to come.

The terms favor USW, but this big gun could rust in the 3 years before it can be used.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Sept. 5	Sept. 6	Sept. 7	Sept. 8	Sept. 10	Sept. 11
Copper, electro, Conn.	40.00	40.00	40.00	40.00	40.00	40.00
Copper, Lake, delivered	40.00	40.00	40.00	40.00	40.00	40.00
Tin, Straits, New York	100.50	100.625	100.875	....	101.25	101.25*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices. **Tentative*

ZINC . . . The American Zinc Institute reports that total smelter output, and all individual grades, for the month of August continued its upward trend, easily topping the last two previous months.

Total production during August was 89,563 tons, as compared to 83,061 for July, and 78,321 for June.

Prime Western output was up to 45,810 tons from the 43,076 turned out in July and 41,898 in June.

Tonnage accepted for the stockpile by the government also took a turn upwards after having dropped slightly in July. The 16,075 tons taken is the most since February 1955, and tops the 14,501 taken the previous month, and 15,085 tons accepted during June.

Unfilled orders at the end of August climbed slightly from the end of previous month to 54,629 tons from 53,559 tons.

Meanwhile, the market remained firm and unchanged. Demand for spot Prime Western was brisk. An increase in demand for Special High Grade is expected in a couple of weeks when automakers increase the pace of new model production.

TIN . . . Market remains pegged at slightly over $1 per lb. Reason: disappointment over the course taken at the Suez conference at Cairo. Since the price moved up about the same time as the trouble began, and has been above $1 ever since, it would now appear that this is the key factor in current market movement.

On the production side, it now appears that things will remain about status quo in the Communist terrorist situation in Malaya. Tengku Abdul Rahman has not followed through with his threat to throw his entire military might against the Communist terrorists if they did not come to terms.

Rahman has been able to rally solid support because he was able to get a promise of independence from Great Britain.

SPECIAL REPORT ON BRISTOL BRASS

Some time ago Bristol Brass was shut down for a few weeks. As the result we were forced to place a few orders for brass elsewhere to prevent our production from being seriously impaired.

One item that was purchased from an alternate source was a brass alloy for a clutch mechanism. Upon receipt of the stock from this source the material cracked in manufacturing. After considerable checking we found that Bristol Brass had made a study of that particular part to determine the best type of material to furnish for manufacturing it properly. They had done something a little bit special to the material for our application. There was no way it could be specified with S.A.E. numbers; it was just plain "know-how" from an analysis of the part, and it had only been recorded on Bristol Brass' records.

This is an extract from a report made by the Vice President in Charge of Manufacturing of a leading maker of precision instruments, to a meeting of his colleagues in Sales and Engineering.

THE BRISTOL BRASS CORPORATION

has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton.

. . . and for BRASS FORGINGS, too . . . get them from **ACCURATE BRASS CORP.** (*Subsidiary of The Bristol Brass Corporation*) now in a new and modern plant at Bristol, Conn.

"Bristol-Fashion" means **Brass at its Best**

Nonferrous Prices *(Effective Sept. 11, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–S.
1100,1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061-0	48.9	44.6	42.8	42.0

Extruded Solid Shapes

Factor	6063 T-5	6063 T-6
6– 8	45.5–47.8	61.8–65.1
12–14	46.2–47.7	62.2–66.8
24–26	49.4–49.5	73.1–77.8
36–38	58.3–59.0	97.4–101.0

Screw Machine Stock—2011-T-3

Size*	¼	⅝–⅜	½–1	1⅛–1½
Price	59.7	58.8	57.4	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250–3.00	.250–2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	100.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.3
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.3

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	113	97	118
Strip, CR	111	99	128
Rod, Bar, HR	94	80	99
Angles, HR	94	80	99
Plate, HR	107	96	111
Seamless tube	144	120	190
Shot, blocks	...	78	...

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	61.63	.....	.....	61.82
Brass, 70/30	52.10	52.64	.....	55.01
Brass, Low	55.35	56.39	55.75	58.66
Brass, R L	57.19	57.73	57.13	60.00
Brass, Naval	55.72	.....	50.03	58.88
Mants Metal	53.84	47.85	49.65	.....
Comm. Bz.	59.08	59.62	59.02	61.64
Mang. Bz.	59.46	.....	53.56	.....
Phos. Bz. 5%	79.58	.....	80.08	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $12.10-$12.60; alloy, $15.00-$15.75; Plate, HR, commercially pure, $10.00-$10.50; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.00-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.55-$7.80; alloy, $7.55-$7.75.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed 27.10
Aluminum pig 25.00
Antimony, American, Laredo, Tex. 33.50
Beryllium copper, per lb conta'd Be $43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $74.75
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Cobalt, 97-99% (per lb) ..... $2.60 to $2.67
Copper, electro, Conn. Valley 40.00
Copper, Lake, delivered 40.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. ..... $90 to $100
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig 35.25
ingot 36.00
Magnesium, sticks, 100 to 500 lb. 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel electro 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. ..... $22 to $24
Platinum, dollars per troy oz. ..... $103 to $105
Silver, New York, cents per troy oz. 90.75
Tin, New York 101.25*
Titanium sponge, grade A-1, $2.70 to $3.00
Zinc, East St. Louis 13.50
Zinc, New York 14.00
Zirconium sponge $10.00
*Tentative.

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 37.75
No. 120 ..... 36.50
No. 123 ..... 35.00
80-10-10 ingot
No. 305 ..... 41.00
No. 315 ..... 39.25
88-10-2 ingot
No. 210 ..... 52.75
No. 215 ..... 48.50
No. 245 ..... 43.50
Yellow ingot
No. 405 ..... 29.75
Manganese bronze
No. 421 ..... 33.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 28.25-29.00
0.60 copper max. 28.00-28.75
Piston alloys (No. 122 type) 27.75-28.75
No. 12 alum. (No. 2 grade) 26.50-27.50
108 alloy 27.00-27.50
195 alloy 27.50-28.50
13 alloy (0.60 copper max.) 28.00-28.75
AXS-679 ..... 27.00-27.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 26.50-27.00
Grade 2—92-95% 25.50-26.00
Grade 3—90-92% 24.50-25.00
Grade 4—85-90% 24.00-24.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	36	35⅛
Yellow brass	27¼	25⅛
Red brass	31⅞	31⅛
Comm. bronze	33⅛	32⅝
Mang. bronze	25¼	24½
Yellow brass rod ends	27	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 34
No. 2 copper wire 32½
Light copper 30½
*Refinery brass 30¾
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 34½
No. 2 copper wire 32½
Light copper 29½
No. 1 composition 30¾
No. 1 comp. turnings 30
Hvy. yellow brass solids 20½
Brass pipe 21¾
Radiators 23

Aluminum

Mixed old cast. ..... 18 —18⅛
Mixed new clips ..... 18½—19½
Mixed turnings, dry ..... 18 —19

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 31 —31⅛
No. 2 copper wire ..... 28½—29⅛
Light copper ..... 26½—27
Auto radiators (unsweated) 19 —19½
No. 1 composition ..... 25½—26
No. 1 composition turnings 24 —24½
Unlined red car boxes ..... 20 —21½
Cocks and faucets ..... 19 —19½
Clean heavy yellow brass 17 —17½
Brass pipe ..... 20½—21
New soft brass clippings .... 22 —22½
No. 1 brass rod turnings .... 19½—20⅛

Aluminum

Alum. pistons and struts 8 — 8⅛
Aluminum crankcases ..... 13 —13⅛
1100 (2S) aluminum clippings 16 —16⅛
Old sheet and utensils 13 —13⅛
Borings and turnings ..... 9 — 9⅛
Industrial castings ..... 13 —13⅛
2024 (24S) clippings ..... 14½—15

Zinc

New zinc clippings ..... 7½— 8
Old zinc ..... 4½— 5
Zinc routings ..... 2¾— 3
Old die cast scrap ..... 2½— 2¾

Nickel and Monel

Pure nickel clippings ..... $1.85-$1.95
Clean nickel turnings ..... $1.55-$1.65
Nickel anodes ..... $1.85-$1.95
Nickel rod ends ..... $1.85-$1.95
New Monel clippings 80-90
Clean Monel turnings 70-80
Old sheet Monel 70-80
Nickel silver clippings, mixed 21
Nickel silver turnings, mixed 18

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7 — 7¼
Batteries, acid-free 4⅛

Miscellaneous

Block tin ..... 80 —81
No. 1 pewter ..... 62½—63
Auto babbitt ..... 42 —42½
Mixed common babbitt ..... 13 —13½
Solder joints ..... 18 —18⅛
Siphon tops 42
Small foundry type ..... 15¼—15⅝
Monotype ..... 14½—15
Lino. and stereotype ..... 13 —13⅛
Electrotype ..... 12½—13⅛
Hand picked type shells ..... 10 —10½
Lino. and stereo. dross ..... 5½— 6⅛
Electro. dross ..... 4½— 4¾

IRON AGE

STEEL PRICES

(Effective Sept. 11, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *A3*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *T8*				
	Pawtucket, R. I. Worcester, Mass.									7.40 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.675 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3 T3*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3,W8*	$107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1, W8*	7.35 *U1, Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1,T8*			7.75 *W8, S9*	14.55 *A1, S9,T8*
	Cleveland, Ohio									6.85 *A5,J3*			7.75 *J3*	
	Detroit, Mich.	$74.00 *R5*		$107.00 *R5*					4.775 *G3, M3*	6.95 *M2,G3, D2,P11*	7.05 *G3*	10.10 *G3, S1,D2*	7.05 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1,I3*	5.00 *I3*	4.675 *U1, I3,Y1*	6.85 *Y1*	6.95 *U1, I3,Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*							4.775 *N4*					
	Indianapolis, Ind.									7.00 *C3*				
	Newport, Ky.												7.75 *N5*	
	Middletown, Ohio									6.85 *A7*				
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1 C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1, J3*	$91.50 *U1, J3, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P8*	5.750 *P6* 6.85 *J5,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3,F3*	6.95 *W3*	9.85 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*		5.00 *Y1*	7.35 *Y1*		4.675 *U1, Y1*	6.85 *Y1,C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.70 *K1*	8.05 *K1*	5.85 *K1*	5.475 *K1*	8.00 *K1*	—			
	Geneva, Utah	$91.50 *C7*				5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*		6.375 *S2*	
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2, C7*	8.00 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C9*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7,B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.								4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2,R3* 5.30 *C16*	7.35 *T2*		4.675 *T2,R3* 4.975 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas		$96.50 *S2*	$112.00 *S2*			7.45 *S2*				7.20 *S2*			

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$9.70 *U1*	$8.40 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$9.70 *B3*		
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*	5.75 *A7*	6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*	6.325 *R3*									
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8,K2*			
	Sterling, Ill.										5.90 *N4,K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3*, M2	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *N5*	5.75 *N5*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$9.60 *U1, I3,Y1*	$8.30 *I3, U1,Y1*	7.15 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.40 *G2*	7.25 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3, N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					8.30 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, A7,J3*	6.325 *U1, A7*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$9.60 *J3, U1*	$8.30 *U1*	7.15 *U1*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$9.60 *W5*	$8.30 *W5*	7.15 *W5* 7.40 *W3*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			7.15 *Y1*
WEST	Fontana, Cal.	5.475 *K1*	6.95 *K1*				7.70 *K1*	9.725 *K1*				$10.35 *K1*	$9.05 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.45 *C7*	$10.35 *C7*	$9.05 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	5.75 *T2*	6.30 *T2, R3*							5.80 *T2,R3*	$9.70 *T2*	$8.40 *T2*	
	Houston, Tex.										6.05 *S2*			

IRON AGE

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.35 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.90 *A2*	5.925 *A2*	6.25 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *C3*			
	Hartford, Conn.			7.35 *R3*		8.625 R3	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.325 *A5* 8.625 *B5*						7.50 *A5,W6* 9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,N5*		6.85 *N5*		
	Canton-Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.575 *P13*	5.075 *U1,R3, N4* 5.575 *P13*	6.85 *A5,B5, W10,L2, W8, L2, N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.075 *W8*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2, R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth, Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.525 *N4*	5.175 *N4*									7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10,C11*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, C11,J3,R3, S9,B4,W10*	6.125 *U1,C11*	8.325 *A5,R3, S9,C8,W10*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											8.40 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.55 *K1*		7.55 *K1*	7.95 *K1*	
	Geneva, Utah	5.175 *C7*						4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		5.325 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3*	7.175 *B2*		8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7,P9* 5.825 *B2*	5.775 *C7,P9* 5.825 *B2*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2* 5.825 *N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.575 *A8*										7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2, R3* 5.375 *C16*	5.075 *T2, R3* 5.375 *C16*				7.425 *T2*	4.85 *T2, R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2*		6.95 *S2*		7.45 *S2*

Steel Prices *(Effective Sept. 11, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston Div., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.
F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Youngstown *R3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Fontana *K1*	0.00	+15.25	3.00	+11.25	5.50	+7.75	8.00	+7.00	8.50	+6.00	9.00	+5.50	10.50	+5.75								
Pittsburgh *J3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Alton, Ill. *L1*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Sharon *M3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Fairless *N2*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Pittsburgh *N1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Wheeling *W5*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Wheatland *W4*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Youngstown *Y1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Indiana Harbor *Y1*	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	22.00	5.75								
Lorain *N2*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Youngstown *R3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Fairless *N2*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Fontana *K1*	4.50		8.50		10.50		11.00		11.50		12.00		12.50									
Pittsburgh *J3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Alton, Ill. *L1*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Sharon *M3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Pittsburgh *N1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Wheeling *W5*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Wheatland *W4*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Youngstown *Y1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Indiana Harbor *Y1*	16.00	2.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	22.00	8.75								
Lorain *N2*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½" and 3" pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.845	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium	.83 D-3, D-5
Oil hardened manganese	.45 O-2
Special carbon	.41 W-1
Extra carbon	.345 W-1
Regular carbon	.29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	34.60	38.60	41.50	
	316	39.70	43.20	46.65	
	321	36.35	39.80	43.50	
	347	39.50	43.95	48.45	
	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

CR Strip (S9) Copper, 10 pct, 2 sides, 41.40; 1 side, 33.60.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	9.00	9.20	.....
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Motor	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60		
		Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*). (20¢ higher, HR)

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9–15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annl'd ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181	...	195	187	8.10	8.50
Aliquippa, Pa. *J3*	167	184	.....	.....	184	8.10	8.65
Atlanta *A8*	169	187	...	197	193	8.20	8.80
Bartonville *K2**	169	187	...	197	193	8.20	8.80
Buffalo *W6*	.....	.....	.....	.....	.....	8.10	8.50
Chicago, Ill. *N4***	167	185	167	195	191	8.10	8.70
Cleveland *A6*	173	.....	.....	.....	.....	8.10	.....
Cleveland *A5*	.....	.....	.....	.....	.....	8.10	.....
Crawfordsville *M4**	169	187	...	197	193	8.20	8.80
Donora, Pa. *A5*	167	181	...	195	187	8.10	8.50
Duluth *A5*	167	181	...	195	187	8.10	8.50
Fairfield, Ala. *T2*	167	181	...	195	187	8.10	.....
Galveston *D4*	169‡	.....	.....	.....	.....	.....	.....
Houston *S2*	172	186	...	192	192	8.35	8.75
Johnstown, Pa. *B3**	167	185	167	...	191	8.10	8.70
Joliet, Ill. *A5*	167	181	...	195	189	8.10	.....
Kokomo, Ind. *C9*	169	183	...	197	189	8.20	8.60
Los Angeles *B2**	.....	.....	.....	.....	.....	9.05	9.65
Kansas City *S2*	172	186	...	200	192	8.35	8.75
Minnequa *C6*	172	186*	172	200	192*	8.35	8.75
Monessen *P6*	167	185	.....	...	191	8.10	8.10
Pittsburg, Cal. *C7*	186	204	.....	...	207	9.05	9.45
Portsmouth *P7*	.....	.....	.....	.....	.....	8.10	.....
Rankin, Pa. *A5*	167	181	...	...	187	8.10	8.50
So. Chicago *R3*	167	181	...	195	187	8.10	8.50
S. San Francisco *C6*	.....	.....	.....	219	...	9.05	9.45
Sparrows Pt. *B3**	.....	.....	.....	197	193	8.20	8.80
Struthers, O. *Y1*	.....	.....	.....	.....	.....	8.10	8.60
Worcester *A5*	173	.....	.....	.....	.....	8.40	8.80
Williamsport, Pa. *S5*	.....	.....	175	.....	.....	.....	.....

Galvanized products computed with zinc at 5¢ per lb. Exceptions: * zinc at 12.5¢ per lb; ** 13½¢ zinc.

‡ —Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Baltimore, Md. *T8*	8.25	10.10	12.90	15.30	18.25
Bristol, Conn. *W12*	.....	.....	12.90	15.30	18.25
Boston *T8*	8.50	10.10	12.90	15.30	18.25
Buffalo, N. Y. *R7*	7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. *S9*	†	9.80	12.60	15.00	.....
Cleveland *A5*	7.95	9.80	12.60	15.00	17.95
Detroit *D1*	8.05	9.90	12.70	15.10	.....
Detroit *D2*	.....	.....	.....	.....	.....
Dover, O. *G4*	7.95	9.80	12.60	15.00	17.95
Franklin Park, Ill. *T8*	8.05	9.80	12.60	15.00	17.95
Harrison, N. J. *C11*	.....	.....	12.90	15.30	18.25
Indianapolis *C5*	8.10	9.95	12.60	15.00	17.95
New Castle, Pa. *B4*	7.95	9.80	12.60	15.00	.....
New Haven, Conn. *D1*	8.40	10.10	12.90	15.30	.....
Pawtucket, R. I. *N7*	8.50	10.10	12.90	15.30	18.25
Pittsburgh *S7*	7.95	9.80	12.60	15.00	17.95
Riverdale, Ill. *A1*	8.05	9.80	12.60	15.00	17.95
Sharon, Pa. *S1*	8.05	9.90	12.70	.....	.....
Trenton *R4*	.....	10.10	12.90	15.30	18.25
Wallingford *W1*	8.40	10.10	12.90	15.30	18.15
Warren, Ohio *T4*	7.95	9.80	12.60	15.00	17.95
Weirton, W. Va. *W3*	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. *A5*	8.50	10.10	12.90	15.30	18.25
Youngstown *C5*	7.95	9.80	12.60	15.00	17.95

‡ On Application.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
National Tube	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
Pittsburgh Steel	2	13	34.88	40.85	.....	.....
	2½	12	46.98	55.01	.....	.....
	3	12	54.24	63.53	.....	.....
	3½	11	63.32	74.16	.....	.....
	4	10	84.09	98.47	.....	.....

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery ‡ Charge	Sheets Hot-Rolled	Sheets Cold-Rolled (15 gage)	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As Rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As Rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	$.10	7.79	9.54	9.12	8.27	.....	8.12	8.57	8.34	9.09	14.99	14.44	18.39	18.09
Birmingham	.15	7.68	8.88	8.85	7.78	.....	8.01	8.65	7.91	10.04	.....	.....	.....	.....
Boston	.10	8.70–8.80	9.73–9.83	10.82–11.02	8.79–8.89	.....	8.98–9.08	8.90–9.00	8.88–8.98	10.71–10.81	15.05	14.45	18.51	18.10
Buffalo	.15	7.90	9.05	10.87	8.15	.....	8.40	8.40	8.15	8.85	15.00	14.45	18.40	.....
Chicago	.15	7.70–7.85	8.88–9.05	9.85	7.78–7.93	.....	8.01–8.16	8.05–8.20	7.91–8.06	8.35–8.50	14.65	14.10	18.05	17.75
Cincinnati	.15	7.97	9.04	9.85	8.21	.....	8.49	8.70	8.34	8.97	14.93	14.38	18.33	18.03
Cleveland	.15	7.83	9.03	9.75	8.03	.....	8.36	8.53	8.14	8.75	14.73	14.18	18.13	17.83
Denver		9.55	11.09	12.41	9.70	.....	9.80	9.60	9.75	10.54	.....	.....	.....	19.79
Detroit	.15	8.06	9.28	10.17	8.25	.....	8.48	8.70	8.33	8.83*	.....	14.04	.....	17.09
Houston		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kansas City	.20	8.52	9.72	10.07	8.60	.....	8.83	8.87	8.73	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.00	10.75	11.75	9.20	.....	9.45	9.05	8.90	11.80	15.85	15.35	19.70	19.45
Memphis	.15	8.02	9.22	.....	8.12	.....	8.35	8.39	8.25	9.85	.....	.....	.....	.....
Milwaukee	.15	7.97	9.17	9.97	8.05	.....	8.28	8.39	8.18	8.72	14.77	.....	18.17	17.87
New Orleans	.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York	.10	8.45	9.63	10.33	8.91	.....	8.88	8.84	8.93	10.71	15.02	14.47	18.42	18.12
Norfolk	.20	8.00	.....	.....	8.40	.....	8.35	8.70	8.45	10.70	.....	.....	.....	.....
Philadelphia	.10	7.89–7.99	9.08–9.18	9.66–10.22	8.58–8.68	.....	8.28–8.38	8.38–8.48	8.37–8.47	9.12–9.22	14.80	14.15–14.25	18.20	17.90
Pittsburgh	.15	7.83	9.03	10.20	8.03**	.....	8.16	8.20	8.06	8.75	14.65	13.80–14.10	18.05	16.85–17.75
Portland		8.90	9.65	11.40	9.05	.....	8.70	8.90	8.95	13.55	16.70	16.10	20.40	20.25
Salt Lake City	.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco	.10	8.85	10.40	10.90	9.05	.....	8.95	8.95	8.90	12.40	15.85	15.35	19.70	19.45
Seattle	.00	9.35	11.20	11.55	9.50	.....	9.05	9.15	9.30	13.15	16.10	15.55	19.50	19.20
St. Louis	.15	8.02–8.17	9.16–9.36†	10.03–10.18	8.11–8.26	.....	8.34–8.49	8.48–8.63	8.25–8.40	8.93–9.08	14.83–14.98	14.28	18.23–18.38	17.93
St. Paul	.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

** F.O.B. Plant, warehouse price. † 16 gage. ‡ Deduct for country delivery.

(Effective Sept. 11, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.075	6.00	6.35				
So. Chicago *R3*				8.775			
Ensley *T2*	5.075	6.00					
Fairfield *T2*		6.00		8.775		6.025	
Gary *U1*	5.075	6.00				6.025	
Ind. Harbor *I3*	5.075		6.35	8.775		6.025	
Ind. Harbor *Y1*				8.775			
Johnstown *B3*		6.00					
Joliet *U1*	5.075		6.35				
Kansas City *S2*				8.775			
Lackawanna *B3*	5.075	6.00	6.35			6.025	
Lebanon *B3*							13.10
Minnequa *C6*	5.075	6.50	6.35	8.775		6.025	13.10
Pittsburgh *P5*				8.775	12.85		
Pittsburgh *J3*				8.775			13.10
Seattle *B2*				9.275		6.35	16.60
Steelton *B3*	5.075		6.35			6.175	13.60
Struthers *Y1*				8.775			
Torrance *C7*							
Williamsport *S5*		6.15					
Youngstown *R3*				8.775			

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net-Ton $14.50 to $14.75
Foundry, beehive (f.o.b. oven)	$17.00 to $18.00
Foundry, oven coke	
Buffalo, del'd	$30.75
Detroit, f.o.b.	29.50
New England, del'd	30.55
Seaboard, N. J., f.o.b.	28.75
Philadelphia, f.o.b.	28.50
Swedeland, Pa., f.o.b.	28.50
Painesville, Ohio, f.o.b.	29.50
Erie, Pa., f.o.b.	29.50
Cleveland, del'd	31.55
Cincinnati, del'd	28.59
St. Paul, f.o.b.	28.50
St. Louis, f.o.b.	30.50
Birmingham, f.o.b.	27.60
Milwaukee, f.o.b.	29.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.75	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	62.92
Electrodeposited	50.28
Brass, 80-20, ball anodes, 2000 lb or more	60.00
Zinc, ball anodes, 2000 lb lots	21.25
(for elliptical add 2¢ per lb)	
Nickel, 99 pct plus, rolled carbon	90.50
(rolled depolarized add 3¢ per lb)	
Cadmium	$1.70
Tin, ball anodes and elliptical	$1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	80.50
Copper sulphate, 5 or more 100 lb bags, per cwt.	27.15
Nickel salts, single, 4-100 lb bags	38.25
Nickel chloride, freight allowed, 300 lb	46.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	22.35
(Philadelphia price 22.60)	
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	29.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Full Container Price	Pct Discounts 30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	55	58½	60½	61½
⅝" thru 1" x longer than 6"	46½	50	52½	54
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	55	58½	60½	61½
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, ½" and smaller x 6" and shorter	54	57½	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full Case or Keg Price
¾ in. or smaller	63
⅞ in. to 1 in. inclusive	59½
1⅛ in. to 1½ in. inclusive	64
1⅝ in. and larger	68
C.P. Hex regular & hvy.	
¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅝ in. and larger	68
Hot Galv. Nuts (All Types)	
¾" and smaller	50
Semi-finished Hex Nuts	
¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅝ in. and larger	58
(Add 25 pct for broken case or keg quantities)	
Finished	
1" and smaller	65

Rivets

	Base per 100 lb
½ in. and larger	$10.85
	Pct Off List
7/16 in. and smaller	26½

Cap Screws

	Discount (Packages) Bright Treated	H. C. Heat
New std. hex head, packaged		
⅛" diam. and smaller x 6" and shorter	47	34
¾", ⅞" and 1" diam. x 6" and shorter	31	13
⅛" diam. and smaller x longer than 6"	18½	+1
¾", ⅞" and 1" diam. & longer than 6"	5½	+19½

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	47	63
¾" through 1" dia. x 6" and shorter	31	51½

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ½" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts,

Plain Finish		Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk	Quantity		
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
In cartons	16	19
In Bulk	Quantity	
⅜" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.4
Chicago	133.4
San Francisco-L. A.	140.2

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$128.00
No. 1 Ohio	128.00
Sec. quality, Pa., Md., Ky., Mo., Ill.,	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	20.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$140.00
Childs, Hays, Pa.	145.00
Chicago District	150.00
Western Utah	144.00-165.00
California	170.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	150.00-157.00
Silica cement, net ton, bulk, Latrobe	26.50
Silica cement, net ton, bulk, Chicago	24.00
Silica cement, net tons, bulk, Ensley, Ala.	25.50
Silica cement, net ton, bulk, Mt. Union	23.00
Silica cement, net ton, bulk, Utah and Calif.	35.00

Chrome Brick	Per net ton
Standard chemically bonded, Balt.	$98.00
Standards chemically bonded, Curtiner, Calif.	108.00
Burned, Balt.	92.00

Magnesite Brick	
Standard Baltimore	$121.00
Chemically bonded, Baltimore	109.00

Grain Magnesite St. ⅝ to ⅛-in. grains

Domestic, f.o.b. Baltimore in bulk	$69.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	43.00
in sacks	49.00

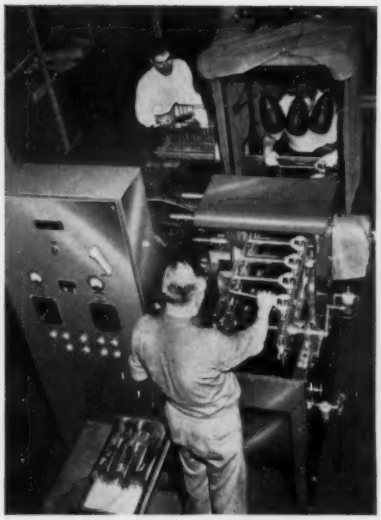
Dead Burned Dolomite	Per net ton
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.00
Midwest	15.60
Missouri Valley	15.00

METAL POWDERS

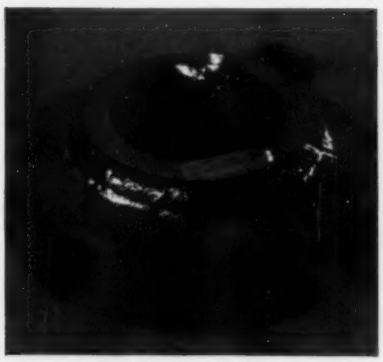
Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron f.o.b. Riverton, N. J., ocean bags	8.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe	86.0¢ to $1.55
Aluminum freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	59.50¢
Copper, reduced	59.50¢
Cadmium, 100-199 lb, 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.35 to $3.85
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	42.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢

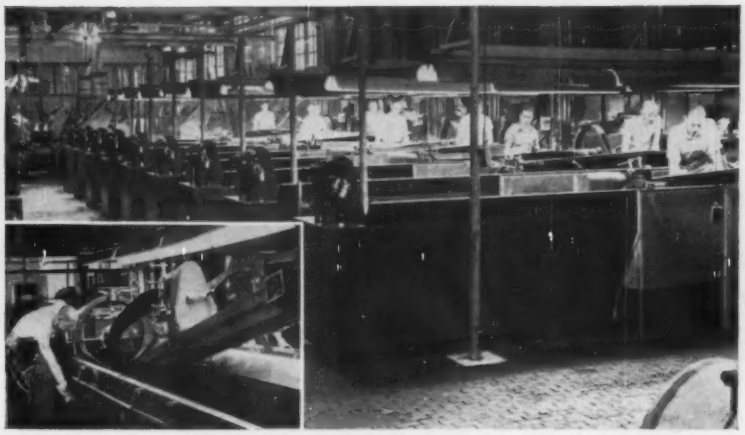
Case Studies:
NONDESTRUCTIVE TESTING SYSTEMS



AUTOMATIC AND HIGH SPEED MAGNAGLO UNIT inspects and processes steam turbine blades. By providing two-directional magnetization at the same time, it reveals cracks in any direction in a single "pass". An ideal method for lower cost, higher speed inspection needs.



INSPECTING MAGNESIUM CASTINGS — Inspection, as such, cannot produce a better product. However, by translating Zyglo indications into corrective measures the foundry can produce castings which meet the needs of their customers. Zyglo fluorescent penetrant inspection detects such flaws as cold shuts, cracks, blows, shrinkage and dross in non-ferrous magnesium or aluminum castings.



Specially designed Magnaflux units tilt for inside-outside inspection of hollow steel propeller blades.

How Lower Production Costs Can Result From "Customized" Testing

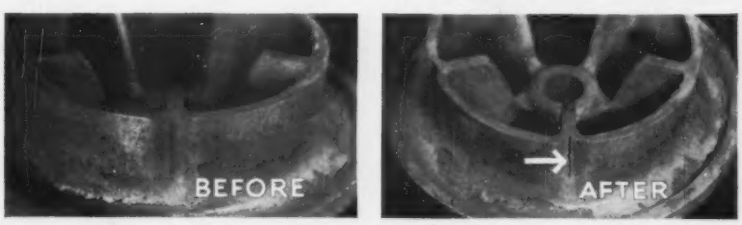
Nobody expects to find defective propeller blades at 20,000 feet. Propeller manufacturers must, and do, discover even the tiniest flaws during manufacture and before their products ever leave the ground. A battery of specially designed Magnaflux units insures defect-free production at the Wright Aero Corp. New Jersey propeller plant.

Of course, you don't make propeller blades. Whatever your product, you can use low cost standard test equipment—or tailor-made production test equipment TO MEET YOUR OWN NEED!

Magnaflux methods detect cracks, seams, porosity and other minute defects during the production process. By evaluating Ⓜ findings, the proper corrective steps are taken to eliminate early defects. Substantial savings result from increased production, doing away with further processing effort on faulty parts, and from reduced scrap losses.

If you're "up in the air" regarding defects in critical components, Magnaflux builds and sells nondestructive test equipment to meet your exact production-line or sample test needs. Or, if your operation requires only occasional reliable testing, why not investigate our Commercial Inspection Service, available on a low-cost basis in most major industrial communities?

For detailed information regarding either service, write today, or contact one of our nearby offices for a personal get-together with an experienced Magnaflux field engineer.



HOW INVISIBLE FORCE DETECTS MECHANICAL DEFECTS

Ⓜ nondestructive testing is based upon simple magnetic principles. A part to be tested is first magnetized—then magnetic powders or fluorescent particles in oil are applied. Surface defects cause a break in the magnetic field—local magnetic poles cause particles to be held on part to mark extent of defect. Above—a Magnaflux indication on grey iron casting.

HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

Write for complete details concerning any of the above case studies, (excerpts from MAGNAFACTS), or ask for our new booklet on Lower Manufacturing Costs.

Take Your Inspection Problems to the House of Answers . . .

MAGNAFLUX CORPORATION

7302 W. Lawrence Avenue • Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15 • Detroit 11 • Dallas 19 • Los Angeles 58

Ferroalloy Prices

(Effective Sept. 11, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C	39.25	0.20% C	36.25
0.03% C	38.75	0.50% C	36.00
0.06% C	37.25	1.00% C	35.25
0.10% C	36.75	1.50% C	35.10
0.15% C	36.50	2.00% C	35.00

4.00-4.50% C, 67.70% Cr, 1-2% Si... 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 25.00
0.025% C (Simplex) 32.50
0.10% C, 50-52% Cr, 2% max Si 33.75
8.50% max. C, 50-55% Cr, 3-6% Si.. 22.50
8.50% C, 50-55% Cr, 3% max Si.... 22.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 33-91% Cr, 0.75% Fe..	1.36

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	1.25
Ton lots	1.27
Less ton lots	1.29

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	23.00
Ton lots	26.75
Less ton lots	28.25

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19½ Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.: Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.75
Johnstown, Pa.	10.75
Sheridan, Pa.	10.75
Philo, Ohio	10.75
S. Duquesne	10.75

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.00
Ton lots packed	15.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$94.00
19 to 21%	3% max.	96.00
21 to 23%	3% max.	98.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	31.5
Ton lots	33.5
250 to 1999 lb	35.5
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 22.85

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	34.00	36.55	37.75
0.07% max. C	31.95	34.50	35.70
0.10% max. C	31.20	33.75	34.95
0.15% max. C	30.45	33.00	34.20
0.30% max. C	28.95	31.50	32.70
0.50% max. C	28.45	31.00	32.20
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	25.45	28.00	29.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b shipping point.

Carloads bulk	12.00
Ton lots	13.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	13.55
Ton lots, packed	15.75

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	20.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets.

Carloads, bulk	7.15
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
	90% Si	18.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo. $1.23

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Brideville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y. freight allowed, carloa, per net ton $200.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, delivered $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.32
bags, f.o.b. Washington, Pa. Langeloth, Pa. $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.33

Zirconium contract basis, per lb of alloy
35-40% f.o.b. freight allowed, carloads, packed ..... 26.25¢
12-15%, del'd lump, bulk-carloads ..... 8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3.14%, Si 40-45%, per lb contained 2 .... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20
F.o.b. Wash., Pa. Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $2.05

On this heat-treating furnace at the Simonds Saw and Steel Co. plant in Fitchburg, Mass., door frames of gray iron buckled after three months. On the same furnace, ductile iron frames lasted a full year. Resisting oxidation and growth, and retaining good mechanical properties at elevated temperatures, ductile iron equipment outperforms by far that of gray cast iron. Ductile iron parts for Simonds were cast by Fitchburg Foundry, Inc., a subsidiary of Kingsbury Machine Tool Corp., Keene, N. H.

Ductile Iron outlasts gray iron 4 to 1 on furnace doors and frames

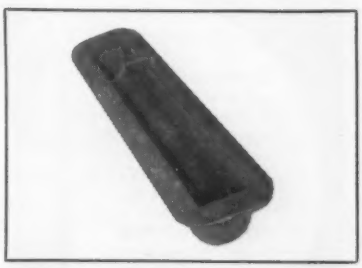
Furnace doors and frames of ductile cast iron help Simonds Saw and Steel Company cut heat-treating costs consistently. In three ways.

First, by *cutting the number of replacement parts needed* for their gas-fired heating furnaces that operate at 1800 to 2100°F. Previously, warpage shortened the life of brick-lined gray iron doors to eight weeks. Ductile iron doors now serve for 32 weeks.

Door frames made of ductile iron also give four times the life and need replacement only once a year.

Use of the ductile iron castings saves money in two other ways. It *saves costly brickwork*, and it *permits increased output* by reducing furnace downtime.

Ductile iron castings can help you where growth, scaling, cracking and distortion of parts needlessly increase your costs. For the facts about the combinations of properties offered by this material send for a copy of "DUCTILE IRON, The Cast Iron THAT CAN BE BENT!" It's full of helpful data. Write for your copy now.



Another way to cut costs. Simonds now uses ductile iron pots to hold molten lead at 1450°F. Where gray iron pots lasted three to four weeks, pots cast in ductile iron average 15 weeks of money-saving service. Ductile iron equipment in elevated temperature service often outlasts gray iron castings 10 to 1.

DUCTILE IRON

ductile iron . . . the cast iron that can be twisted and bent

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street, New York 5, N. Y.

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The few perforations illustrated are indicative of the wide variety of our line—we can perforate almost any size perforation in any kind of metal or material required. Send us your specifications.

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BRASS, ZINC, ANY METAL, ANY PURPOSE

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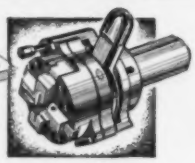

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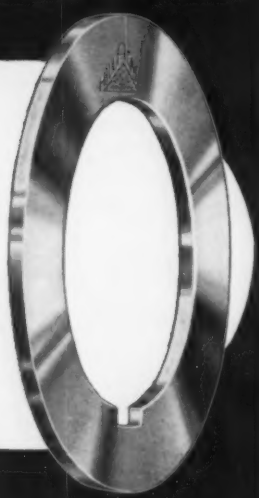

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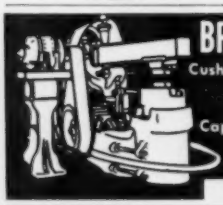

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Flash-Butt Welding

How to Use It to Help Put the Profits Back Into Manufacturing

What is Flash-butt Welding?

Flash-butt welding is a resistance welding process for end to end joining of rods, tubes, bars, forgings, fittings, etc., to achieve the greatest possible strength. It is accomplished by positioning the pieces to be joined with clamping electrodes so that there is initially light contact between abutting edges (Fig. 1).

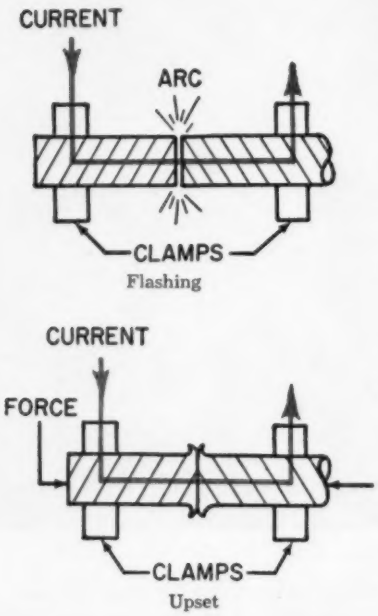

Fig. 1. Flash-butt welding process.

Introduction of the current causes flashing which generates great heat. As the metal is burned away the pieces are moved together in an accelerating motion. Thus, uniform flashing action is maintained for the most efficient heating process. When the inner faces obtain the proper temperature, they are forced together under high pressure and the current is cut off. The impurities (oxides, slag, etc.) formed during flashing are forced out in the upset action leaving pure base metal to form a high strength bond (Fig. 3).

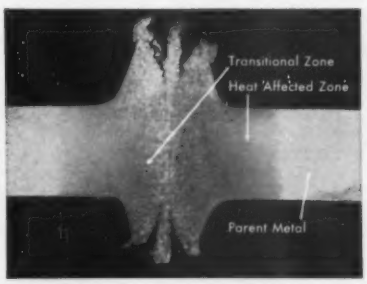

Fig. 2. Macrograph of 2" O.D. x .095" wall of 4140 alloy steel tubing flash-butt welded on a Sciaky Type BMW. 3-400 machine.

Advantages of Flash-butt Welding

Flash-butt welding offers a 100% strength factor compared to 80% strength factor for flame and arc welds. Further, no extra material such as gas, rod, or flux is required. *The material itself forms the weld.*

Flash-butt welding has low power demand and power consumption. Higher production speeds are more readily achieved with this process than with any other fastening method. The localized heat minimizes part distortion. Generally, no special preparation of the weld surfaces is required.

Simplicity and effectiveness of the Sciaky Flash-butt weld technique reduces multi-step fastening operations to just one. One operator (not skilled) can consistently produce high quality welds.

Dissimilar metals with widely varying melting temperatures are easily flash-butt welded.

Fig. 3. Destruction test on extruded aluminum miter joint. Note that failure is in parent metal, not in the weld.

How to Use Flash-butt Welding

Whenever ideal flash-butt welds are required, the size and shape of the parts to be welded should be identical. However, a maximum of 15% variation in end dimension is usually permissible for commercial usage. New applications for this process are opening up every day. Often little, or no change in existing design allows conversion to high production flash-butt welding.

New Research Center for Your Fastening Problems

Sciaky's new three-quarter million dollar Research Center is equipped with the most advanced resistance welding machines, testing instruments, and trained personnel. The entire facility is devoted to solving *your* joining problems and advancing the application and development of resistance welding. The Research Center invites *you* to submit your fastening problems.

Build Your Data File with Free Sciaky Literature

Write today on your company letterhead describing your particular field of interest. We will send suitable back issues (as well as future issues) of our "Resistance Welding At Work" publication, showing typical joining problems solved by this method of fastening. All contain impressive case history examples of Sciaky basic thinking—resistance welding techniques designed to *put profits back into manufacturing.*

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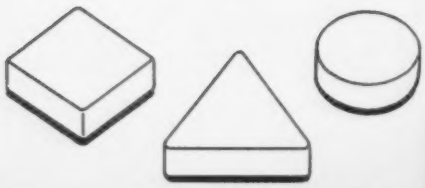

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150%

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Carmet throw-away blanks are designed for any type of tool holder. This same manufacturer reports that the ease and speed with which used blanks may be exchanged for new ones has reduced downtime for tool change-over by 7%.

Advantages such as these are as important in your industry as they are in aircraft production. Call your Carmet dealer TODAY for his advice on any production problems you may have . . . or write *Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Mich.*

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News of Used and Rebuilt Machinery

Summer In New York . . . New York area business dealers have enjoyed a very pleasant summer, thank you. Business slowed seasonally, but trade has still been brisk enough to keep up a soothing tinkle of cash registers. There is little doubt that fall will bring brisker buying, and despite the slump in July and August, summer 1956 has still been well ahead of last year.

Latest figures from National Machinery Dealers Assn. give a heartening picture. In the period Jan. 1 to June 30 this year, business was 6 pct over the previous 6 months. More significantly, the first 6 months of this year have been 30.6 pct higher than first half of '55. And third quarter figures, when available, are expected to show about the same growth over the same period last year.

Late Models Preferred . . . Biggest headache is still getting equipment to sell. Good, late model machines are in constant short supply, and when they are offered, the price tags are hefty.. In many cases dealers can't afford to stock them; must try and line up buyers before they actually have the machines. But when buyers do come in, they are generally willing to pay.

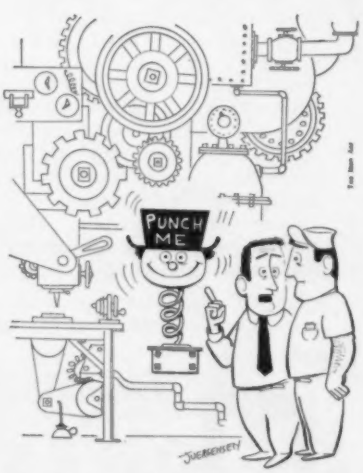
Higher prices for new tools are an important factor in the last few weeks. But the demand is for late model equipment. If a buyer can use older machines at all, he expects bargains. Some dealers privately say that some of this stress on the latest models may stem from current tight money and bank pressures. They believe that customers are unwilling to pay high interest rates and banks are unwilling to lend money save for the very newest tools.

Easier money, they feel, would add zest to the forthcoming pick-up sales. Unfortunately, there is no easy money in sight.

Heavy Duty Inquiries . . . Demand is holding up for all types of machinery. Fabricating equipment—shears, press brakes, ironworkers and the like—continue in good demand. And little fall-off is expected even when winter slows construction. Cranes are a much-wanted item, although high costs of dismantling, moving and re-erection are a handicap. The last two or three weeks have seen a marked upturn in inquiries for heavy duty equipment in all lines, especially heavy hydraulic power presses in the 1000 and 1500 ton range. One dealer reports he had six inquiries for such presses last week alone.

Tracer Controls Tried

Two new 85-ton Onsrud contour profile milling machines equipped with General Electric tracer control systems reportedly are licking a lot of production problems at Boeing's Wichita, Kans., plant. Officials say the controls made possible stepped-up parts production, greater precision and reduced number of machines needed.



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5 ton Cleveland 96' Span 230 Volt D.C.
10 ton Cyclops 40' Spon 220/440 A.C.
10 ton P&H 96' Span 220 Volt D.C.
15 ton P&H 48' Span 230 Volt D.C.
20 ton Toledo 75' Span 350/3/60 A.C.
25 ton L-B 60' Span 440/3/60 A.C.
With 5-ton Auxiliary
25 ton L-B 75' Span 220/3/60 A.C.
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2—40 ton Trolleys & 5-ton Auxiliary
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72" McKay 17 Rolls 2½" Dia. Backed-up
84" McKay 17 Rolls 4⅛" Dia.
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600 ton Southwark 16" Stroke, Bed 60x74"
750 ton Elmes, 54" Stroke, Platen 30¼x38"
800 ton Clearing, 48" Stroke, Bed 48x48"
1000 ton Lake Erie Dble Acting, 46" Strokes, Bed Area & Platen 72 x 146"
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2	600	Al. Ch.	300/600	600	Mill
2	600	Whse.	110/220	230	Mill
1	450	Whse.	450/600	230	SK
1	300	Whse.	300	230	Mill
4	275	Whse.	425/850	230	QM-600.6
1	150	Whse.	360/720	600	QM-600.3

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1	100	1200	Whse.	CW	440/220
1	104	870	Whse.	CW	440/220
1	125	600	G.E.	I-14-M	2200
1	150	450	Whse.	CW-1000	440
1	150	490	Whse.	CW	440/220
1	150	585	Whse.	CW	4160/2200
1	150	720	Al. Ch.	ARY	440/220
1	200	427	G.E.	I-M	440
1	200	490	G.E.	I-14-M	2200
2	200	585	G.E.	I-12-M	2200
1	250	590	G.E.	MT-414	2200
1	250	720	Al. Ch.	ARY	440
1	350	585	Whse.	CW	2300
1	400	360	G.E.	MT-424	2300/440
1	400	505	Al. Ch.	ARY	2200
1	425	392	G.E.	I-M	440
1	450	440	Whse.	CW	2200
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D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
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1	1200	G.E.	MCF	600	650/800
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		250	450/550
1	500	Whse.	CC-216	600	300/900
8	450	Whse.		550	415
1	250	G.E.	MPC	230	400/600
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
1	150	Whse.	SK-151B	230	900/1800
1	130	G.E.	MPC	230	250/1000
1	125	Whse.	SK-183	230	850
2	100	Whse.	SK-181	230	450/1000
1	100	G.E.	CD	230	400/1200
3	75	C.W.	53H-TEFC	230	860
1	50	G.E.	MD-412AE	230	550
1	50	Whse.	SK-131.5		
			B.B.D.P.	230	600/2200
4	30/40	Whse.	SK-131	230	500/1500

M-G Sets—3 ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
1	3000(3U)	G.E.	514	600	4000/6900/ 13200
2	2000/2400	G.E.	450	250/300	2300/4600
1	1750/2100	G.E.	514	600	4000/6900/
1	2000	G.E.	500 25cg	660	11000
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	750	G.E.	720	125250	2300/4600
1	500	G.E.	900	540/540	4150
1	500	Whse.	900	125/250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	3000	A.C.	OISC	3	23000x2300
1	2500	A.C.	Furnace	3	13800x147/113.5
1	2500	A.C.	OISC	3	34520x13800
4	2000	Whse	OISC	3	6900x480
1	2000	Whse.	OISC	3	6900x2300/3985Y
3	1000	G.E.	HVDDJ	1	2400x480
2	1000	Wagner	OISC	1	13200x460
3	667	G.E.	HD	1	13800x2300
2	500	Kuh	OISC	1	13200x6600
3	333	G.E.	HS	1	7200x2400/4160Y
3	333	G.E.	HD	1	13200x2300
3	333	G.E.	HSWR	1	2300/4000x230/460
1	300	G.E.	HT	3	4160x480/277
3	200	Whse.	OISC	1	13200x120/240

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2600'	6.050"	.450/.510	16-24'
1800'	6.050"	.500	18-21'
100'	6⅝"	.875	18-21'
1348'	7"	.500/.550	35-40'
400'	7.390"	.600	18-21'
780'	7⅛"	.500	38-40'
180'	7.656"	.565/.575	16-21'
3400'	8⅛"	.460	25-32'
540'	8⅛"	.500	28-33'
372'	8⅛"	.718	25-35'
85'	8⅛"	.750	16-18'
1325'	8⅛"	.875/.900	26-30'
1890'	8⅛"	.906	26-32'
38'	8⅛"	.950/1.000	18-20'
175'	8⅛"	1.375	24-26'
1781'	9⅛"	.750	18-40'
516'	10¾"	.450	16-40'
450'	11⅛"	.750/.800	16-20'
2094'	11¾"	.750/.800	16-40'
725'	11¼"	1.150/1.200	10-25'
452'	11¾"	1.450/1.500	16-25'
254'	11¾	1.700/1.800	16-26'
448'	11¾"	1.750/1.800	16-25'
126'	11¼"	2.100/2.200	16-20'
246'	11⅞"	.625	6'
136'	12¼"	1.000	20-30'
158'	12¼"	1.312	12-24'
156'	14"	.500	34-44'
76'	14"	1.125	10-23'
278'	14"	2.100/2.200	16-20'
203'	14"	2.600	10-20'
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15.6'	36"	1.000	15.6'
16.8'	38¾"	1.436	8-8.8'

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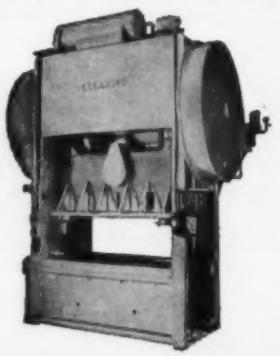

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500	Westg.	CW	350
300	G.E.	IM-17B	600
250	*G.E.	I-M	450
200	Westg.	CW	900
200	G.E.	IM	900
200	Westg.	CW	514
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METALWORKING BRIEFS

PRR To Seek Freight Rate Boost

An increase in freight rates will be sought by the Pennsylvania Railroad soon, but by how much has not been revealed. Unofficial reports that the hike would amount to 15 pct were neither confirmed nor denied by PRR spokesman.

Reynolds Metals Buys Massena Site

The Reynolds Metals Co. purchased 1500 acres near Massena, N. Y., as a site for an aluminum reduction plant and possibly a fabricating plant. The location would give Reynolds access to St. Lawrence-Great Lakes shipping lanes plus the area's tremendous power output.

Kaiser Files For Fast Tax

Fast tax write-off of $65 million for more steel capacity has been asked by Kaiser Steel Corp. for its Fontana mill and Eagle Mountain ore project. Total of applications filed by steel companies for tax aid in recent weeks now reaches $846 million.

Proposed Industrial Area For South

Tri-State Tombigbee Valley Assn. has been organized in Alabama, Mississippi and Tennessee to promte the proposed Tombigbee-Tennessee Waterway and the industrial and agricultural development of the Tombigbee Valley. Birney Imes, Columbus, Miss., is chairman.

Inland Waterways Freight Traffic Gains

Freighting on the nation's 29,000 miles of inland waterways may have exceeded 100 billion ton-miles last year. A preliminary tabulation by the U. S. Army Corps of Engineers shows 1955 tonnages were at least 10 billion above the first estimate earlier this year. It will mean a 21 pct gain over 1954. American Waterways Operators Inc., report major traffic gains of the Gulf Intracoastal Waterway, Gulf Coast ports, and the Mississippi and Ohio Rivers and their tributaries.

Beryllium Lands Big AEC Contract

The Beryllium Corp., Reading, Pa., was awarded a contract estimated at more than $23 million by the Atomic Energy Commission for production of 500,000 pounds of nuclear grade pure beryllium. Deliveries will cover a five-year period. The firm, which had gross sales of $11.3 million last year, is planning a $4 million expansion program.

Contract Awarded For Naval Nuclear Power Plant

Contract for construction of the first nuclear power plant for a naval surface ship has been awarded by the Navy Dept. to Westinghouse Electric Corp. Estimated cost of the contract, which is of the cost plus, fixed fee basis, is $18,335,305.

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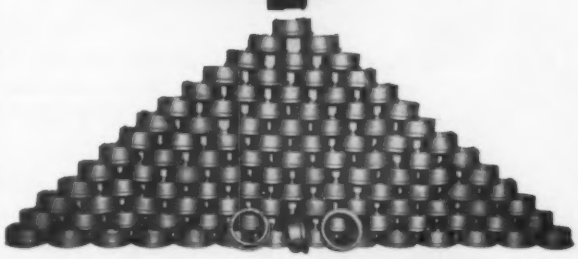

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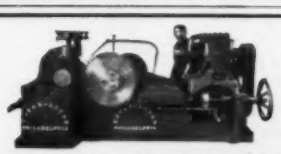

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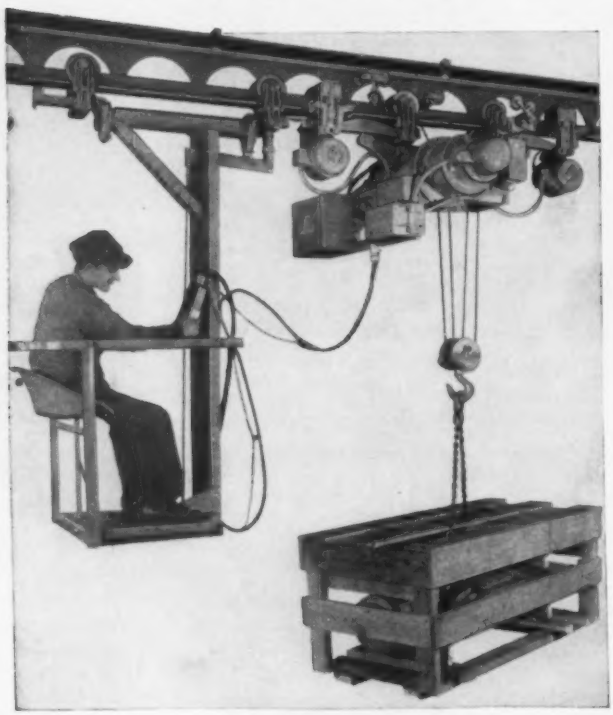

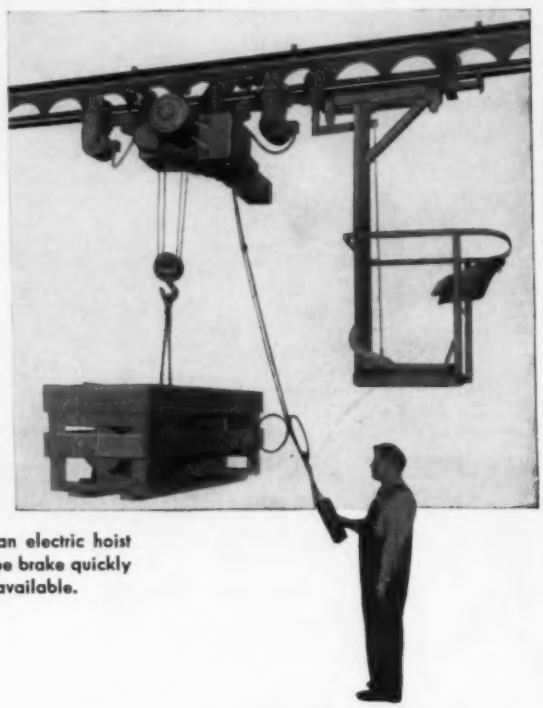

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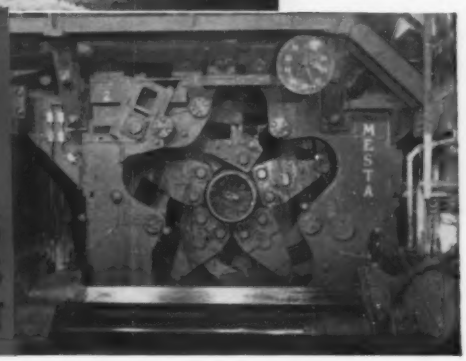

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